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STATE VOCATIONAL-TECHNICAL AND TRADE SCHOOLS OF LOUISIANA  
CATALOG.

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MATERIALS ARE DESCRIBED FOR 42 TRADE PREPARATORY  
TRAINING COURSES, SEVEN APPRENTICE TRAINING COURSES, TWO  
TRADE EXTENSION TRAINING COURSES, AND 13 SUPERVISORY  
PERSONNEL DEVELOPMENT COURSES. INFORMATION FOR EACH INCLUDES  
A LISTING OF THE MATERIALS (STUDY ASSIGNMENTS, JOB SHEETS,  
TEST BOOKS, ANSWER BOOKS, INSTRUCTOR'S AIDS), REQUIRED  
REFERENCES, AND A DETAILED OUTLINE OF THE COURSE. (EL)

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*Published by*

STATE OF LOUISIANA  
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# CATALOG

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# ***Foreword***

The Vocational Curriculum Development and Research Center annually publishes a catalog of materials which are available to the state vocational-technical and trade schools of Louisiana.

This catalog is divided into four sections, Trade Preparatory Training Courses, Apprentice Training Courses, Trade Extension Training Courses and Supervisory Personnel Development Courses. Each course is described as to its format, how it is to be ordered, what instructors aids are available, the required bibliography, and a detailed outline of the material.

The catalog is punched for a three ring binder. It is recommended that it be placed in a binder so that new material can be readily added or revised material be replaced conveniently.

We hope this material will be of use to the various schools.

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June, 1967

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4. Civil Engineering Technology
  - (1) Map Drafting and Related Computations
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6. Farm Mechanics
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8. Industrial Drafting
9. Industrial Engines
10. Industrial Instruments Technology
11. Machine Shop
12. Office Occupations
  - (1) Accounting
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  - (4) Business Letter Writing
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  - (6) Business Structure, Organization, and Management
  - (7) Filing
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  - (10) Office Practice
  - (11) Payroll Records and Accounting
  - (12) Personal Development
  - (13) Posting Machine
  - (14) Printing Calculator
  - (15) Rotary Calculator
  - (16) Salesmanship
  - (17) Shorthand
  - (18) Spelling
  - (19) Ten-Key Adding-Listing Machine
  - (20) Typewriting
13. Practical Nurse Education
14. Practical Physics
15. Radio-Television-Electronics
16. Refrigeration and Air Conditioning
17. Sheet Metal
18. Small Craft Operation and Navigation
19. Small Engines Mechanics
20. Tractor Maintenance and Repair
21. Vocational-Technical Drawing
22. Watchmaking Technology
23. Welding

## SECTION II

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4. Machinist
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7. The Plumbing and Pipe Fitting Industry - Steam Fitting

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1. Electrical Utility Workers Training Program
2. Highway Engineering Aide Training Program

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### Supervisory Personnel Development

1. Business Letter Writing for Industrial Supervisors
2. Conference Leadership
3. Economics for Industrial Supervisors
4. Extemporaneous Talk for Industrial Supervisors
5. Highway Economics
6. Industrial Housekeeping
7. Industrial Relations
8. Interviewing for Supervisory Personnel
9. Introduction to Management
10. Listening
11. Report Writing
12. Understanding Human Nature
13. Work Simplification

AUTO MECHANICS  
Trade Preparatory

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The Auto Mechanics Course (Trade Preparatory) was published in 1948-49 and was revised in 1955, 1958 and again in 1963. This course is available in loose form with the Related Study Assignment, Job and Math stapled together and in book form.

Book I

Related Study Assignments	Units I - V
Jobs	Units I - V
Mathematics	Unit I

Book II

Related Study Assignments	Units VI - X
Jobs	Units VI - X

Book III

Related Study Assignments	Units XI - XV
Jobs	Units XI - XV

Book IV

Related Study Assignments	Units XVI - XX
Jobs	Units XVI - XX

Test Books

Book I	Units I - V
Book II	Units VI - X
Book III	Units XI - XV
Book IV	Units XVI - XX

Answer Book

Complete for Units I - XX

The following Instructor's Aids are available:  
Progress Chart  
Individual folder type

The references for the Auto Mechanics (Trade Preparatory) Course are the following:

Title	Source
GENERAL REPAIR TOOLS FOR AUTOMOBILE MECHANICS	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
Glenn, Harold T. AUTOMECHANICS	Charles A. Bennett Co., Inc. 237 N. Monroe Street Peoria, Illinois
Crouse, William H. AUTOMOTIVE MECHANICS 3rd and 4th Editions	McGraw-Hill Book Co. 330 West 42nd Street New York 36, New York



References (Continued)

Title	Source
MOTOR SERVICE'S AUTOMOTIVE ENCYCLOPEDIA	Goodheart-Willcox Co. 1322 South Wabash Ave. Chicago 5, Illinois
BARRETT BRAKE SERVICE, BOOK I	Barrett Brake Equipment 21st and Cass St. Louis, Missouri
Stockel Martin W. AUTO MECHANICS FUNDAMENTALS	Goodheart-Willcox Co. 18250 Harwood Ave. Homewood, Illinois
Stieri BASIC WELDING PRINCIPLES	Prentice-Hall Englewood Cliffs New Jersey

A detailed outline of the Auto Mechanics Course (Trade Preparatory) follows:

Unit I - Benchwork

Math	1	Addition of Whole Numbers
Math	1A	Subtraction of Whole Numbers
Math	1B	Linear Measurement
R.S.A.	1	Hand Tools and How to Use
Job	1	Identify Assigned Tools
Math	2	Scale Practice
R.S.A.	2	Bolts and Nuts Specifications
Job	2	Identif/ Bolts and Nuts
Math	3	Addition of Scale Measurements
R.S.A.	3	Files and Filing
Job	3	Make a Drill Gauge
Math	4	Subtraction of Scale Measurements
R.S.A.	4	Twist Drills
Job	4	Sharpen a Twist Drill
Math	5	Multiplication of Whole Numbers
R.S.A.	5	Drilling and Tapping
Job	5	Reading the Micrometer
Job	5A	Make Internal Thread Block
Math	6	Division of Whole Numbers
R.S.A.	6	Threading
Job	6	Make a Stud
Math	7	Reducing Fractions to Lowest Terms
R.S.A.	7	Installing Studs and Removing Broken Studs
Job	7	Remove Broken Stud by Drilling
Job	7A	Remove Broken Stud with Extractor
Job	7B	Repair Damaged Threads by Installing Heli-coil

Unit I - Benchwork (Continued)

Math	8	Changing Improper Fractions to Mixed Numbers
R.S.A.	8	Solder, Soldering, and Soldering Coppers
Job	8	Soldering
Job	8A	Make a Bolt and Nut Tray
Job	8B	Wire Splicing and Soldering
Math	9	Changing Mixed Numbers to Improper Fractions
R.S.A.	9	Grinding a Screwdriver
Job	9	Grind a Screwdriver
R.S.A.	10	Tubing
R.S.A.	10A	Flex Tubing (Hose)
Job	10	Tubing, Cutting, Flaring, and Bending

Unit II - Preventive Maintenance

R.S.A.	1	Lubricating Oils
Job	1	Drain Crankcase and Refill
R.S.A.	2	Engine Lubrication
Job	2	Remove and Replace Element in Oil Filter
R.S.A.	3	Air Cleaners
Job	3	Remove, Clean, Refill, and Replace Air Cleaner
R.S.A.	4	Lubrication
Job	4	Lubricate Automobile

Unit III - Front and Rear Wheel Service

R.S.A.	1	Front Wheel Service
Job	1	Remove, Lubricate, and Adjust Front Wheel Bearing
R.S.A.	2	Grease Seals and Rear Wheel Bearings
Job	2	Remove and Install Rear Wheel Bearings and Grease Seal

Unit IV - Shock Absorbers and Springs

R.S.A.	1	Operating Principles of Shock Absorbers and Stabilizer
Job	1	Remove and Replace a Direct-Acting Type Shock Absorber
Job	1A	Remove and Replace Stabilizer
R.S.A.	2	Springs and Shackles
Job	2	Remove and Replace Rear Springs
Job	2A	Remove and Replace Front Coil Spring
R.S.A.	3	Rear Coil Springs, Torsion Bars, Air Level Suspension
Job	3	Remove and Replace Rear Coil Spring
Job	3A	Remove and Replace Torsion Bars and Adjust Front Suspension Height

Unit V - Steering and Front End Alignment

R.S.A.	1	Tie Rod Ends and Toe-in
Job	1	Remove and Replace Tie Rod Ends and Adjust Toe-in

Unit V - Steering and Front End Alignment (Continued)

R.S.A.	2	Steering Gear Adjustments
Job	2	Overhaul Gemmer Steering Gear and Adjust
Job	2A	Overhaul and Adjust a Saginaw Steering Gear
R.S.A.	3	Power Steering
Job	3	Checking a Power Steering Unit
R.S.A.	4	Principles of Front End Geometry
Job	4	Align Front Wheels, Caster, Camber and Toe-in
R.S.A.	5	Wheel Balancing
Job	5	Balance Wheel
R.S.A.	6	Reaming
Job	6	Rebush Spindle (Pressed in Bushings)
R.S.A.	7	Front End Alignment on Ball Joint Suspension
Job	7	Front Wheel Alignment on Ball Joint Suspension
Job	7A	Remove and Replace Front Suspension Ball Joint
Job	7B	Remove and Replace Upper and Lower Control Arms

Unit VI - Brakes

R.S.A.	1	Brake Shoes and Lining
Job	1	Adjust Hand Brakes
R.S.A.	2	Brake Adjustments
Job	2	Adjust Brakes (Minor)
R.S.A.	3	Principles of Hydraulic Brake Systems
Job	3	Bleed Hydraulic Brake System and Replenish Brake Fluid
R.S.A.	4	Hydraulic Master Cylinders and Wheel Cylinders
Job	4	Remove and Recondition Wheel Cylinders
Job	4A	Remove and Recondition a Master Cylinder
Job	4B	Replace Broken Brake Line
R.S.A.	5	Brake Drums
Job	5	Turn Brake Drum
Job	5A	Reline Brakes, and Adjust (Bendix)
R.S.A.	6	Power Brakes
Job	6	Remove and Recondition a Power Brake Unit and Replace
Job	6A	Reline Brake and Adjust (Lockheed)

Unit VII - Universal Joints, Drive Shafts, and Rear Axle

R.S.A.	1	Universal Joints and Drive Shafts
Job	1	Remove and Repair a Universal Joint (Cross and Two Yoke Type)
Job	1A	Remove and Repair a Universal Joint (Ball and Trunnion Type)
Job	1B	Remove and Replace Rear Axle
R.S.A.	2	Principles of the Differential
Job	2	Disassemble, Assemble and Adjust Rear End
Job	2A	Disassemble and Adjust Rear End (Chrysler Products)

Unit VII - Universal Joints, Drive Shafts, and Rear Axle  
(Continued)

R.S.A.	3	Differential Service
Job	3	Overhaul Rear End
R.S.A.	4	Traction Drive
Job	4	Remove and Overhaul Safe-T Track Rear Axle

Unit VIII - Clutch and Transmission

R.S.A.	1	Principles of the Clutch
Job	1	Adjust Clutch Pedal Free Play
R.S.A.	2	Clutch Service
Job	2	Remove and Replace Clutch
R.S.A.	3	Principles of the Transmission
Job	3	Adjust Gearshift Linkage
R.S.A.	4	The Synchromesh Transmission
Job	4	Disassemble and Assemble Transmission (Ford)
Job	4A	Disassemble and Assemble Transmission (Chevrolet)
Job	4B	Disassemble and Assemble Transmission (Pontiac)
R.S.A.	5	Transmission Troubles
Job	5	Remove, Overhaul and Replace Transmission
R.S.A.	6	Overdrive
Job	6	Remove, Overhaul and Replace Overdrive
R.S.A.	7	Roto-Hydra-Matic Transmission
Job	7	Adjust Control Linkage on a Roto-Hydra-Matic Transmission
Job	7A	Disassemble and Assemble Roto-Hydra-Matic Transmission
R.S.A.	8	Controlled Coupling or Super Hydra-Matic Transmission
Job	8	Disassemble and Assemble a Controlled Coupling Transmission
R.S.A.	9	Powerglide Transmission Service Adjustments
Job	9	Powerglide Transmission Linkage Adjustment
R.S.A.	10	The Powerglide Transmission
Job	10	Disassemble and Repair Powerglide Transmission
R.S.A.	11	Cruise-O-Matic Band and Throttle Linkage Adjustment
Job	11	Adjust Throttle Linkage and Bands on Cruise-O-Matic Transmission
R.S.A.	12	The Cruise-O-Matic Transmission
Job	12	Disassemble and Repair a Cruise-O-Matic Transmission
R.S.A.	13	The Torqueflite Transmission
Job	13	Disassemble and Repair Torqueflite Transmission
R.S.A.	14	Transmission-Push Button Controls
Job	14	Push Button Control Cable Adjustment

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Unit IX - Fuel System

- |        |    |   |
|--------|----|---|
| R.S.A. | 1  | Fuel Gauges and Fuel Pumps  |
| Job    | 1  | Test Fuel Level Gauge   |
| Job    | 1A | Replace Gas Lines and Flexible Gasoline Connection                      |
| Job    | 1B | Check Fuel Pump Pressure, Vacuum and Volume                             |
| Job    | 1C | Overhaul Fuel Pump, Install on Engine, and Test                         |
| R.S.A. | 2  | Principles of Carburetion   |
| R.S.A. | 2A | Carburetor Circuits   |
| Job    | 2  | Remove, Disassemble, Clean and Repair a Carburetor (Carter BBS)         |
| R.S.A. | 3  | Carburetor Circuits (Rochester)   |
| Job    | 3  | Remove, Disassemble, Clean and Repair a Carburetor (Rochester Model BC) |
| Job    | 3A | Remove, Disassemble, and Repair a Ford V-8 Carburetor                   |
| R.S.A. | 4  | Four Barrel Carburetor  |
| Job    | 4  | Remove, Disassemble and Repair a Four-Barrel Carburetor (Rochester 4GC) |
| R.S.A. | 5  | Choke Control and Manifold Heat Control                                 |
| Job    | 5  | Free Up Heat Control Valve  |
| R.S.A. | 6  | Fuel Injection  |
| Job    | 6  | Solder Leak in Fuel Tank  |

Unit X - Ignition System

- |        |    |  |
|--------|----|--|
| R.S.A. | 1  | Basic Principles of Electricity  |
| R.S.A. | 1A | Battery Service  |
| Job    | 1  | Service a Battery  |
| R.S.A. | 2  | High Tension Cables and Spark Plugs  |
| Job    | 2  | Service Spark Plugs, High Tension Wires and Distributor Cap  |
| R.S.A. | 3  | Ignition System  |
| Job    | 3  | Remove and Replace Distributor Points and Set Ignition Timing  |
| Job    | 3A | Tune Up Checks and Adjustment. (Vacuum, Dwell, Timing, Compression, Coil, Condenser, Spark Plugs, Distributor Resistance, and Ignition Primary Circuit Resistance) |

Unit XI - Generators and Regulators

- |        |    |   |
|--------|----|---|
| R.S.A. | 1  | Generators  |
| R.S.A. | 1A | Generator Service                                   |
| Job    | 1  | Remove, Disassemble, Repair and Replace a Generator |
| R.S.A. | 2  | Generator Regulators                                |
| Job    | 2  | Check and Adjust a Voltage Regulator                |
| R.S.A. | 3  | Alternators (A.C. Generators)                       |
| Job    | 3  | Testing Alternator Output (A.C. Generator)          |



Unit XII - Starting Motors

- |        |    |   |
|--------|----|---|
| R.S.A. | 1  | Starting Motor Fundamentals, Cables, Controls and Drives  |
| Job    | 1  | Install New Starter Cables and Solenoid Switch  |
| R.S.A. | 2  | Starter Maintenance and Test  |
| Job    | 2  | Check Starter Insulated Circuit, Solenoid Resistance, Battery Capacity, and Starter Amperage Draw |
| Job    | 2A | Install and Test Field Windings for Open Circuits and Grounds                                     |
| Job    | 2B | Remove, Overhaul and Replace Starter  |

Unit XIII - Cooling System

- |        |   |  |
|--------|---|--|
| R.S.A. | 1 | Functions of the Cooling System  |
| Job    | 1 | Remove, Inspect, Test and Replace Water Pump, Thermostat, Fan Belt, and Pressure Cap |
| R.S.A. | 2 | Flushing Cooling System  |
| Job    | 2 | Remove, Solder, Test, And Replace Radiator   |
| R.S.A. | 3 | Antifreeze   |
| Job    | 3 | Install and Test Antifreeze  |

Unit XIV - Engine Overhaul (Benchwork)

- |        |    |   |
|--------|----|---|
| R.S.A. | 1  | Engine Fundamentals and Components                                      |
| Job    | 1  | Clean Engine with Cold (or Hot) Degreasing Solution                     |
| R.S.A. | 2  | Oil Pumps and Pressure Regulators                                       |
| Job    | 2  | Remove, Inspect, and Replace Oil Pump                                   |
| Job    | 2A | Clean Oil Pressure Relief Valve   |
| Job    | 2B | Remove and Replace Expansion Plug                                       |
| R.S.A. | 3  | Valve Operating Mechanisms  |
| Job    | 3  | Remove, Reface and Replace Rocker Arms                                  |
| R.S.A. | 4  | Servicing Valves  |
| Job    | 4  | Grind Valve on I-Head Engine  |
| R.S.A. | 5  | Valve Timing  |
| Job    | 5  | Remove and Replace Timing Gear or Chain                                 |
| R.S.A. | 6  | Engine Bearing, Crankshaft and Camshaft                                 |
| R.S.A. | 6A | Piston Pins and Bushings  |
| Job    | 6  | Remove Old and Fit New Piston Pin and Bushing, and Align Connection Rod |
| R.S.A. | 7  | Piston, Rings and Cylinders   |
| R.S.A. | 7A | Cylinder Reconditioning   |
| Job    | 7  | Rebore Cylinder   |
| Job    | 7A | Overhaul Engine Completely  |

Unit XV - Engine Repairs

- |     |   |  |
|-----|---|--|
| Job | 1 | Remove Engine From Car and Replace it  |
| Job | 2 | Adjust New Connecting Rod Bearing with Engine in Car (Precision Insert Type) |
| Job | 3 | Adjust Main Bearings with Engine in Car                                      |
| Job | 4 | Grind Valves on I-Head Engine in Car   |

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Unit XVI - Lights and Horns

- R.S.A. 1 Lights and Lighting Circuits  
Job 1 Install Headlight Sealed Beam and Focus  
Headlights  
Job 1A Test for Short, Open and Ground Circuit at  
Headlight  
Job 1B Install Dimmer Switch  
Job 1C Install Stop Light Switch  
Job 1D Install Headlight Switch  
Job 1E Install New Wiring Harness  
R.S.A. 2 Horns, Switches, and Relays  
Job 2 Install New Horns and Relay  
Job 2A Test for Open and Short in Horn that will not  
Blow  
Job 2B Install New Horn Wiring Circuit  
R.S.A. 3 Turn Signals and Back-up Lights  
Job 3 Servicing Turn Signals and Back-up Lights

Unit XVII - Automobile Accessories

- R.S.A. 1 Accessory Equipment  
Job 1 Install Heater  
Job 1A Remove and Install Speedometer  
Job 1B Remove, Clean, Adjust, and Replace Vacuum  
Windshield Wiper Motor  
Job 1C Install Mufflers and Tail Pipes and Adjust  
Brackets  
R.S.A. 2 Electric Wiper Motors  
Job 2 Remove, Clean, Inspect, Replace and Adjust  
Electric Wiper  
R.S.A. 3 Power Seats  
Job 3 Remove and Replace Power Front Seat Adjuster  
R.S.A. 4 Air Condition Service  
Job 4 Check for Leaks, Repair Leaks and Recharge  
Air Conditioning System on Chevrolet  
Job 4A Remove and Replace Air Conditioner Dryer-  
Receiver Tank on Chevrolet  
Job 4B Remove and Replace Air Conditioning Thermostatic  
Expansion Valve on Chevrolet  
Job 4C Replace Air Conditioner Compressor Seal on  
Chevrolet

Unit XVIII Welding-Oxyacetylene

- R.S.A. 1 Setting Up Equipment  
Job 1 Set Up Oxyacetylene Welding Apparatus  
R.S.A. 2 Welding Steel  
Job 2 Run Beads, Flat Position 1/8" Material  
Job 2A Flat Position Butt Weld 1/8" Material  
R.S.A. 3 Flame Cutting  
Job 3 Hand Cut 1/2" Material

Unit XVIII - Welding-Oxyacetylene (Continued)

R.S.A.	4	Bronze Welding
Job	4	Flat Position Butt Welding 1/8" Material
Job	4A	Bronze Weld Cast Iron Plate

Unit XIX - Arc Welding

R.S.A.	1	Equipment and Striking an Arc
Job	1	Set Up Welding Machine and Strike Arc
Job	1A	Run Continuous Stringer Beads, Flat Position 1/4" Material
Job	1B	Lap Joint Weld Flat Position 1/4" Material

Unit XX - Shop Practices

R.S.A.	1	Frame and Body
Job	1	Remove and Replace Door Lock; Adjust
Job	1B	Adjust Striker Plate
Job	1C	Align Doors



The Cabinetmaking Course was published in 1952. It is available in the following forms:

For students the material is stapled in individual packages. Related Study Assignments, Jobs, Job Information Sheets, Auxiliary Jobs, Tests and Math are included in Book 1 - Unit 1.

Related Study Assignments, Jobs, and Job Information Sheets are included in Book 2 - Units 2, 3, 4.

Answer Book

Complete for tests and math

The following instructor's aids are available:

Individual Folder Type

There are no references since all needed information is given in the Job Information Sheets.

A detailed outline of the Cabinetmaking Course follows:

Unit I - Furniture

Job	1	End Table Legs
J.I.S.	1	The Crosscut Saw
R.S.A.	1	Wood Screws
Math.	1	How to Use the Rule
Test	1	
Job	2	Stretchers for End Table
J.I.S.	2	Hand Rip Saw
R.S.A.	2	Wood Glue
Math.	2	Calculating Board Feet and Cost
Test	2	
Job	3	End Table Top and Assembly
J.I.S.	3	Dividers and Their Use
R.S.A.	3	Clamps and Clamping
Math.	3	Calculating Sheet Products and Their Cost
Test	3	
Job	4	Chair
J.I.S.	4	The Jointer and Its Use
R.S.A.	4	Nails
Math.	4	Laying Out a 45° Angle
Test	4	
Job	5	Night Table
J.I.S.	5	Preparation of Uniform Stock, Etc.
R.S.A.	5	Making a Template (The Cabriole Leg)
Math.	5	Addition of Fractions
Test	5	

Course Outline (Continued)

Unit I - Furniture (Continued)

Job	6	Step Table
J.I.S.	6	Drawer Construction (Flush Type)
R.S.A.	6	Making a Bill of Material
Math.	6	Subtraction of Fractions
Test	6	
Job	7	Bookcase
J.I.S.	7	Radial Saw
R.S.A.	7	Coated Abrasives
Math.	7	Division of Fractions
Test	7	
Job	8	Cocktail Table
J.I.S.	8	Basic Furniture Units of Construction
R.S.A.	8	Cabinetmaking Hardware - Hinges
Math.	8	The Decimal System
Test	8	
Job	9	Pembroke Table
J.I.S.	9	Making Rule Joint
R.S.A.	9	Wood Seasoning
Math	9	Simple Percentage
Test	9	
Job	10	Chest of Drawers
J.I.S.	10	Drawer Guides
R.S.A.	10	Plywood
Math.	10	Personal Checks and Drafts
Test	10	
Job	11	China Cabinet
J.I.S.	11	Lathe and Lathe Operations
R.S.A.	11	Grading of Lumber
Math.	11	Interest and Taxes
Test	11	
Job	12	Desk
J.I.S.	12	Woodworking Joints
R.S.A.	12	Lumbering
Personal and Social Problems		
Test	12	
Job	13	Special Project (Selected by the Student)
R.S.A.	13	Bearings and Power Transmission
R.S.A.	14	Evolution of Furniture
R.S.A.	15	Louisiana Woods Suitable for Cabinetmaking
Test	13	

Course Outline (Continued)

Unit I - Furniture (Continued)

- Auxiliary Job 14: Sharpening Handsaws
- Auxiliary Job 15: Attaching Sanding Disc
- Auxiliary Job 16: Care of Electric Motors
- Auxiliary Job 17: Sharpening Bevel Edge Tools
- Auxiliary Job 18: Sharpen Circular Saws
- Auxiliary Job 19: Replacing Jointer Knives
- Auxiliary Job 20: Changing Circular Saw Blade
- Auxiliary Job 21: Pulley Ratios and Machine Speeds
- Auxiliary Job 22: Sharpening Auger Bits
- Auxiliary Job 23: Dressing Abrasive Wheels
- Auxiliary Job 24: Replacing Band and Small Saw Blade

Unit II - Wood Finishing

- R.S.A. 16: Preparation of Surface
- R.S.A. 17: Varnish Brushes
- R.S.A. 18: Spraying Equipment
- R.S.A. 19: Finishing Abrasives
- R.S.A. 20: Stains
- J.I.S. 1: Applying Oil Stains
- J.I.S. 2: Applying Water Stain
- R.S.A. 21: Crack Fillers
- R.S.A. 22: Wood Fillers
- J.I.S. 3: Applying Filler

Course Outline (Continued)

Unit II - Wood Finishing (Continued)

- R.S.A. 23: Sealers
- R.S.A. 24: Shellac
- J.I.S. 4: Applying Shellac
- R.S.A. 25: Turpentine
- R.S.A. 26: Varnish
- J.I.S. 6: Applying Lacquer Sealers
- J.I.S. 7: Applying Lacquer
- R.S.A. 28: Linseed and Tung Oils
- J.I.S. 8: Oil Finish
- J.I.S. 9: A New Finish
- J.I.S. 10: Bleaching Wood
- R.S.A. 29: Enamels
- R.S.A. 30: Characteristics of Wood Affecting Finish
- R.S.A. 31: Pigments

Unit III - Custom Work

- Job 1: Kitchen Cabinet Base
- R.S.A. 32: Hardware, Trim, Its Application and  
Miscellaneous Items
- R.S.A. 33: Covering Materials  
Cabinetmaking Drawing, Plates 1-19
- Job 2: Kitchen Cabinet Top
- R.S.A. 34: New Materials  
Cabinetmaking Drawing, Plates 20-44
- Job 3: Dining Corner Cabinet  
Cabinetmaking Drawing, Plates 45-52

Unit IV - Production Work

Supplementary Hand Jobs

Unit I - Furniture

Job	1:	Lawn Table
J.I.S.	1:	Layout and Cut a Cross Lap Joint
Test	1	
Job	1-A:	Colonial Bench
J.I.S.	1-A:	Bench Vise and Stops
R.S.A.	1-A:	The Shop
Test	1-A:	
Job	1-B:	Utility Stand
J.I.S.	1-B:	Layout and Cut Duplicate Parts
Test	1-B:	
Job	1-C:	Lawn Chair
Test	1-C:	
Job	2:	End Table
J.I.S.	2:	Lay Out and Cut Tapers with Jack Plane
Test	2:	
Job	3:	Cobbler's Bench
J.I.S.	3:	To Cut A Rabbet with a Rabbet Plane
Test	3:	

The Carpentry Course (Trade Preparatory) was written and published in 1955. The course was revised in 1958 and again in 1963. Instructors may secure the material in book form (4 books; R.S.A.'s, Jobs, Tests, and Answers). Student material is stapled in loose form, that is, each job with the corresponding related material. The material is to be ordered by Unit and Job number. An individual permanent record folder is also available.

The references for the Carpentry (Trade Preparatory) Course are listed below.

Title	Source
HAND WOODWORKING TOOLS	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
F. S. Crispin DICTIONARY OF TECHNICAL TERMS	The Bruce Publishing Co. 540 North Milwaukee St. Milwaukee 1, Wisconsin
C. Thomas Olivo BASIC MATHEMATICS SIMPLIFIED	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
PRACTICAL PROBLEMS IN MATHEMATICS FOR CARPENTERS	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
Ramsey and Sleeper ARCHITECTURAL GRAPHIC STANDARDS	John Wiley and Sons, Inc. 440 Park Ave. South New York 16, New York
French and Svensen MECHANICAL DRAWING	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
BLUEPRINT READING AND SKETCHING CARPENTRY TRADES RESIDENTIAL	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
CONCRETE FORM CONSTRUCTION	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
FRAMING, SHEATHING AND INSULATION	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York

References (Continued)

Title	Source
Wilson and Werner SIMPLIFIED ROOF FRAMING	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
INTERIOR AND EXTERIOR TRIM	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
Wilson and Werner SIMPLIFIED STAIR LAYOUT	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
THE USE OF HAND TOOLS AND PORTABLE MACHINERY	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
PORTABLE POWER TOOLS	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
ARMSTRONG INSTALLATION MANUAL	Armstrong Cork Company Lancaster, Pennsylvania

A detailed outline of the Carpentry (Day Preparatory) Course follows.

- Unit I    Hand Tools and Their Uses
- R.S.A. 1 - Measuring Tools, Bench Vise and Stops
  - Job 1 - Flower Pot Base, Octagon Top
  - R.S.A. 2 - Layout Tools, Testing Tools, and  
            Sawing Tools
  - Job 2 - Flower Pot Base, Bottom Cross Pieces (Legs)
  - R.S.A. 3 - Bench Planes, Edge Cutting Tools and  
            Mallets
  - Job 3 - Make 3 Tapered Table Legs
  - R.S.A. 4 - Boring Tools
  - Job 4 - Mortise Table Legs
  - R.S.A. 5 - Smoothing Tools and Coated Abrasives
  - Job 5 - Stretchers For End Table
  - R.S.A. 6 - Woodworking Joints and Moldings, Wood  
            Glues, and Clamps and Clamping
  - Job 6 - To Make An End Table
  - R.S.A. 7 - Miter Box and Fasteners Corrugated
  - Job 7 - Picture Frame, Size 8" x 10"



Course Outline (Continued)

Unit I (Continued)

- R.S.A. 8 - The Compass Saw and Coping Saw
- Job 8 - Make Book Ends
- R.S.A. 9 - Hand Router Plane, Dadoes, Plywood, and Grading
- Job 9 - Flower Box
- R.S.A. 10 - Sawhorses, Lumbering, Wood Seasoning, and Grading of Lumber
- Job 10 - Make a Sawhorse
- R.S.A. 11 - To Be Selected By Instructor
- R.S.A. 12 - To Be Selected By Instructor

Unit II Drafting

- R.S.A. 1 - Introductory Drafting Unit of Carpentry
- Job 1 - Basic Lines
- R.S.A. 2 - The Language of Drawing and Learning to Draw
- Job 2 - Lay Out Sheet, Horizontal and Vertical Lines
- R.S.A. 3 - Lettering
- Job 3 - Technique of Lettering
- Job 3A - Six Squares, Dividing Into Angles
- R.S.A. 4 - Lines and Dimensions
- Job 4 - Lines and Dimensions
- R.S.A. 5 - Geometrical Construction
- Job 5 - Geometric Problems
- Job 5A - Dial Plate
- R.S.A. 6 - Theory of Shape Description
- Job 6 - Slotted Block, 2-View
- Job 6A - Tenon
- R.S.A. 7 - Reading and Making Drawings
- Job 7 - Offset Spacer, 3-View
- R.S.A. 8 - Hidden Lines
- Job 8 - End Stop
- Job 8A - Inkwell Base
- Job 8B - Tool Post Slide
- Job 8C - V-Guide and Wedge
- R.S.A. 9 - Sections
- Job 9 - Protected Bearing
- Job 9A - Stuffing Box Gland
- Job 9B - Yoke
- Job 9C - Lever Arm
- R.S.A. 10 - Auxiliary Views and Revolutions
- Job 10 - Tapered Wedge
- R.S.A. 11 - Principles of Size Description
- Job 11 - Hollow Molding
- R.S.A. 12 - Technique of the Finished Drawing
- Job 12 - Adjustable Bracket
- Job 12A - Shaft Support



Course Outline (Continued)

Unit II (Continued)

- R.S.A. 13 - Sheet Metal Drafting (Isometric)
- Job 13 - Truncated Square Prism
- Job 13A - Transition Piece
- Job 13B - Truncated Cylinder
- R.S.A. 14 - Pictorial Drawing
- Job 14 - Isometric Figures
- R.S.A. 15 - Production Illustration
- Job 15 - Isometric Offset Block
- Job 15A - Dovetail Figures
- Job 15B - Isometric Cube
- R.S.A. 16 - Screws, Bolts and Other Fastenings
- Job 16 - Machine Bolt
- R.S.A. 17 - Architectural Drawings
- Job 17 - Floor Plan Garage
- R.S.A. 18 - Architectural Drafting
- Job 18 - Foundation and Detail of Roof Construction
- R.S.A. 19 - Architectural Drafting
- Job 19 - Front Elevation
- Job 19A - Side Elevation

Unit III Foundations

- R.S.A. 1 Surveying Instruments
- Job 1 - Set Up and Level the Builder's Transit or Level
- Job 1A - Find the Difference of Level of Two Points
- Job 1B - Run a Straight Line
- R.S.A. 2 - Principles of Laying Out Building Lines
- Job 2 - Locate a Building on a Lot
- R.S.A. 3 - Principles of Erecting and Leveling Batter Boards
- Job 3 - Erect Batter Boards
- R.S.A. 4 - Description, Construction and Erection of Continuous Wall Footing Forms
- Job 4 - Build and Set a Section of Continuous Footing Form
- R.S.A. 5 - Description, Construction and Erection of Pier Footing Forms
- Job 5 - Build a Pier Footing Form
- R.S.A. 6 - Description, Construction and Setting of Concrete Foundation Form Walls and How to Provide for Openings
- Job 6 - Build and Set a Section of Double Wall Form
- R.S.A. 7 - Description of and How to Suspend Anchor Bolts in Concrete Forms
- Job 7 - Suspend Anchor Bolts in Concrete Forms
- R.S.A. 8 - Description, Construction and Setting of Concrete Pier Forms
- Job 8 - Build a Concrete Pier Form

Course Outline (Continued)

Unit III (Continued)

- R.S.A. 9 - Description, Construction and Setting of  
Concrete Step Forms
- Job 9 - Build and Set a Concrete Step Form
- R.S.A. 10 - Description of and Setting Forms for  
Concrete Floors and Sidewalks
- Job 10 - Build a Section of Concrete Sidewalk Form
- Job 11 - To Be Selected By Instructor

Unit IV Frame Construction

- R.S.A. 1 - Description of Types of Sill Construction  
and How to Frame and Install Sills
- Job 1 - Lay Out, Cut and Assemble Solid Sills
- R.S.A. 2 - Description of Floor Joists and How to  
Install
- Job 2 - Lay Out and Install Floor Joists
- R.S.A. 3 - How to Lay Out, Cut and Install Bridging
- Job 3 - Lay Out, Cut and Install Bridging
- R.S.A. 4 - Description of Methods of Laying Subfloors
- Job 4 - Lay Subfloor Diagonally to Floor Joists
- R.S.A. 5 - How to Lay Out and Cut Plates to Length
- Job 5 - Locate, Lay Out and Cut Plates
- R.S.A. 6 - How to Lay Out and Cut Studs for Side  
Walls
- Job 6 - Lay Out and Cut Studs for a Single Story  
Building
- R.S.A. 7 - Corner Posts
- Job 7 - Build a Corner Post
- R.S.A. 8 - How to Frame Walls in a Balloon Frame;  
Description of and How to Frame Openings  
in the Outside Walls of a Balloon Frame;  
and How to Frame Walls in the Platform  
and Modern Braced Frame
- Job 8 - Assemble Wall Sections
- R.S.A. 9 - Bracing
- Job 9 - Bracing a Wall Section
- R.S.A. 10 - Description of and How to Frame Interior  
Partitions
- Job 10 - Assemble and Erect an Inside Partition
- R.S.A. 11 - How to Space the Second and Attic Floor  
Joists
- Job 11 - Install Ceiling Joists
- R.S.A. 12 - Description of Methods of Applying  
Sheathing
- Job 12 - Apply Outside Wall Sheathing
- R.S.A. 13 - Description and Function of Insulating  
Materials
- Job 13 - Install Insulating Material
- Job 14 - To Be Selected By the Shop Instructor

Course Outline (Continued)

Unit V Roof Framing, Sheathing and Shingles

- R.S.A. 1 - Terms, Types, and Principles of Roof Framing; Description of Methods of Laying Out a Common Rafter; and Steel Square Common Rafter Table
- R.S.A. 1A - The Framing Square and The Rafter
- Job 1 - Lay Out and Cut a Common Rafter Using the Step-off Method
- R.S.A. 2 - How to Erect a Gable Roof, and Light Wood Framing Details
- Job 2 - Frame a Gable Roof
- R.S.A. 3 - How to Lay Out, Cut and Install Gable Studding
- Job 3 - Lay Out, Cut, and Install Gable Studs
- R.S.A. 4 - Determining the Length of a Collar Tie
- Job 4 - Lay Out, Cut, and Install Collar Ties
- R.S.A. 5 - Description of Methods of Laying Out Hip Rafters and Steel Square Hip Rafter Table
- Job 5 - Lay Out and Cut a Hip Rafter
- R.S.A. 6 - Method of Laying Out Hip Jack Rafters and Steel Square Hip Jack Rafter Table
- Job 6 - Lay Out and Cut a Hip Jack Rafter
- R.S.A. 7 - How to Erect a Hip Roof
- Job 7 - Frame a Hip Roof
- R.S.A. 8 - Description of Methods of Laying Out Valley Rafters; and Steel Square Valley Rafter Table
- Job 8 - Lay Out and Cut a Valley Rafter
- R.S.A. 9 - Method of Laying Out a Valley Jack Rafter; Method of Laying Out a Valley Cripple Jack Rafter; and Steel Square Valley Jack Rafter Table
- Job 9 - Lay Out and Cut a Valley Jack Rafter
- R.S.A. 10 - Method of Laying Out the Hip-Valley Cripple Jack Rafter and Steel Square Hip-Valley Cripple Rafter Table
- Job 10 - Lay Out and Cut a Hip Valley Cripple Jack Rafter
- R.S.A. 11 - How to Erect an Intersecting Gable Roof
- Job 11 - Frame an Intersecting Roof
- R.S.A. 12 - Types of Window Screens
- Job 12 - Apply Roof Sheathing
- R.S.A. 13 - Methods of Applying Roll Roofing
- Job 13 - Apply Roofing Felt
- R.S.A. 14 - Description of Composition Roof Covering and How to Apply Strip Shingles
- Job 14 - Apply Strip Shingles

Course Outline (Continued)

Unit VI Exterior Trim

R.S.A. 1 - Description and Construction of Window Frames

Job 1 - Build a Window Frame

R.S.A. 2 - How to Assemble and Install Window Frames

Job 2 - Install a Window Frame

R.S.A. 3 - Description and Types of Aluminum Window Units and Installation Instruction

Job 3 - Install an Aluminum Window Unit

R.S.A. 4 - Types of Door Frames

Job 4 - Build an Exterior Door Frame

R.S.A. 5 - How to Build and Install Door Frames

Job 5 - Install an Exterior Door Frame

R.S.A. 6 - Description of Common Types of Cornices and How to Build

Job 6 - Apply Box Cornice

R.S.A. 7 - Description and Application of Corner Boards

Job 7 - Apply Corner Boards

R.S.A. 8 - Louvers in Frame Walls

Job 8 - Build and Install a Louver

R.S.A. 9 - Description and Application of Exterior Side Wall Covering

Job 9 - Apply Bevel Siding

R.S.A. 10 - Stair Types, Terms and Principles and Stair Layout

Job 10 - Lay Out, Cut and Assemble a Set of Steps

R.S.A. 11 - The Miter Box and Saw

Job 11 - Build a Miter Box

R.S.A. 12 - Types of Window Screens

Job 12 - Build, Fit and Hang a Window Screen

R.S.A. 13 - How to Fit Full Surface Hinges and How to Apply Mortise Locks

Job 13 - Build, Fit and Hang a Screen Door

Job 14 - To Be Selected by the Shop Instructor

Unit VII Interior Trim

R.S.A. 1 - Description and Laying Finish Floors and Wood Flooring

Job 1 - Lay Finish Flooring

R.S.A. 2 - Methods of Hanging Window Sash, How to Fit Window Sash, and Wood Double Hung and Wood Casement Windows

Job 2 - Install Window Sash

R.S.A. 3 - Description and How to Apply Window Trim

Job 3 - Apply Interior Window Trim

R.S.A. 4 - Description of Window Hardware

Job 4 - Apply Window Hardware

Course Outline (Continued)

Unit VII (Continued)

- R.S.A. 5 - Types of Door Frames and How to Install Door Frames
- Job 5 - Build and Install an Interior Door Frame
- R.S.A. 6 - Description of Interior and Exterior Doors; How to Fit a Door; and Stock Wood Doors
- Job 6 - Fit and Hang a Door
- R.S.A. 7 - Description of Finish Hardware and How to Apply Mortise Locks
- Job 7 - Install a Mortise Lock
- R.S.A. 8 - How to Build Stairs with Housed and Open Stringers and Description and How to Fit Newel Posts and Hand Rails
- Job 8 - Lay Out, Cut and Assemble a Stair
- R.S.A. 9 - Types and Installation of Baseboards
- Job 9 - Install Baseboards
- Job 9A - Install Shoe Moulding
- Job 10 - To Be Selected by the Shop Instructor

Unit VIII Portable Power Tools and Their Uses

- R.S.A. 1 - Description, The Circular Handsaw and Portable Saw Blades; Care of Circular Saw Blades; and Methods of Using The Portable Circular Saw
- R.S.A. 1A - Description of Kitchen Cabinets and How to Build and Install a Kitchen Cabinet
- Job 1 - Build and Install Kitchen Base Cabinet
- R.S.A. 2 - Description, The Radial Arm Saw; General Instructions for Operation and Adjustment of the Radial Arm Saw; and Methods of Using the Radial Arm Saw
- R.S.A. 2A - Description of Kitchen Wall Cabinets and How to Build Wall Cabinets
- Job 2 - Build and Install Kitchen Wall Cabinets With a Drop Ceiling
- R.S.A. 3 - Description, The Electric Router; Description of Router Bits and Methods of Inserting Bits in the Collet and Assemble Motor Into Router Base; and Basic Routing Cuts
- R.S.A. 3A - How to Construct Cabinet Drawers and How to Assemble a Cabinet Drawer
- Job 3 - Construct and Assemble Cabinet Drawers
- R.S.A. 4 - Description, The Portable Power Block Plane and Methods of Using the Portable Power Block Plane
- R.S.A. 4A - How to Fit Cabinet Doors
- Job 4 - Fit Cabinet Doors



Course Outline (Continued)

Unit VIII (Continued)

- R.S.A. 5 - Description, The Portable Electric Hand Drill; Drills and Bits; and Safety Precautions in Using the Portable Electric Hand Drill
- R.S.A. 5A - How to Apply Cabinet Hardware
- Job 5 - Apply Cabinet Hardware
- R.S.A. 6 - Description, The Portable Sabre Saw and Blades; How to Install Sabre Saw Blades and Base Insert; Methods of Using the Portable Sabre Saw
- R.S.A. 6A - Installing Counter Surfaces With Metal Trim and Cove Metal
- Job 6 - Fit and Apply Laminated Plastic Counter Top
- R.S.A. 7 - The Portable Electric Power Plane; Safe Methods in Using the Portable Electric Power Plane and How to Use the Electric Portable Power Plane
- R.S.A. 7A - Description of Mantel Shelves and How to Build Mantel Shelves
- Job 7 - Build and Install a Mantel Shelf
- R.S.A. 8 - Description, The Portable Belt Sander and General Procedures for Using the Belt Sander
- R.S.A. 8A - Selection of Abrasive Belts
- R.S.A. 8B - Methods of Building and Installing Built-In-Bookcases
- Job 8 - Build a Book Case
- R.S.A. 9 - Description, Finishing Sanders; Selection and Installation of Abrasives; and Care and Use of the Finishing Sander
- R.S.A. 9A - Description of Corner Cabinets
- Job 9 - Corner Cabinets
- R.S.A. 10 - Reciprocating Saws and Methods of Operating the Reciprocating Saw
- R.S.A. 10A - How to Build and Install a Medicine Cabinet
- Job 10 - Medicine Cabinet
- R.S.A. 11 - Description of Linen Closet
- Job 11 - Linen Closet
- R.S.A. 12 - Description, The Hinge Butt Templet; Description, The Lock Mortiser; Description, The Lock Face Templet
- R.S.A. 12A - Description of Clothes Closets
- Job 12 - Linen Closet

CIVIL ENGINEERING  
TECHNOLOGY  
Map Drafting and  
Related Computations

C Page 1 of 1

The Map Drafting and Related Computations section of the Civil Engineering Technology Course was written in 1964 and is available in bound form. The course is composed of 12 sections in one book, and a Field Book. A detailed outline of this course is given below.

- Section 1 Introduction
  - Section 2 Directions of Lines
  - Section 3 Plotting Angles
  - Section 4 Plotting Traverses
  - Section 5 Latitudes and Departures
  - Section 6 Calculation of Areas
  - Section 7 Route Surveys with Circular Curves
  - Section 8 Topographic Maps
  - Section 9 Profiles and Cross Sections
  - Section 10 Area Maps
  - Section 11 Reproduction of Drawings
  - Section 12 Assignments and Directions for Exercises
- Field Survey Notes

ELECTRICAL DIAGRAMS  
Trade Preparatory

C Page 1 of 1

This compendium of Electrical Diagrams may be used in any situation requiring the use of such circuits. It is not designed to be limited to any one particular curriculum. It is recommended that it be used as a reference when and where needed. Other uses may develop depending on the requirements of a job and the ability of the student. Additional diagrams will probably be added to future editions of this reference if usage indicates that this is desirable.

A list of diagrams follows:

Signal Circuits . . . . .	20 Diagrams
Lighting Circuits . . . . .	26 Diagrams
Industrial Control Circuits . . . . .	26 Diagrams
Appliance Circuits . . . . .	5 Diagrams



The Farm Mechanics Course is available in loose leaf form. The references for the courses will be listed in the separate courses. The instructors will request jobs from the following courses as they see fit:

- Carpentry
- Electricity
- Machine Shop
- Plumbing
- Small Engine Repair
- Tractor Repair and Maintenance
- Welding

A detailed outline of the Farm Mechanics Course follows:

#### CARPENTRY

##### Unit I - Hand Tools (Required)

- Job 1: Use Layout Tools
- Job 2: Use Wood Cutting Tools
- Job 3: Use Boring and Driving Tools
- Job 4: Lay out and Construct a Sawhorse
- Job 5: Lay out and Construct a Shoulder Box
- Job 6: Lay out a House

- R.S.A. 1: Measuring and Layout Tools
- R.S.A. 2: Wood Boring Tools
- R.S.A. 3: Wood Cutting Tools
- R.S.A. 4: Wood Cutting Tools (Continued)
- R.S.A. 5: Driving Tools
- R.S.A. 6: Nails, Screws, and other Fasteners
- R.S.A. 7: Lumber

##### Unit II - Foundations (Required)

- Job 1: Build Bulkhead Forms for a Footing
- Job 2: Build Bulkhead Forms for a Slab
- Job 3: Mix, Pour and Dredge a Concrete Slab

- R.S.A. 1: Concrete Formwork
- R.S.A. 2: Mixing Concrete

##### Unit III - Framing (Optional)

- Job 1: Install Wood Sills
- Job 2: Install Floor Joists
- Job 3: Install Floor Joist Headers and Bridging
- Job 4: Construct a Subfloor
- Job 5: Lay out, Assemble and Fasten Lower Plates (Soles)
- Job 6: Lay out, Fabricate and Raise Wall Frames
- Job 7: Lay out and Construct Ceiling Joists
- Job 8: Lay out, Cut and Erect Common Rafters

Course Outline (Continued)

Unit III - Framing (Optional) (Continued)

Job 9: Lay out, cut and Erect Hip, Valley, Hip Jack, and Valley Jack Rafters

Job 10: Sheathe a Wall

R.S.A. 1: Wood sills, floor joists, bridging and headers

R.S.A. 2: Subfloors

R.S.A. 3: Frame Lay Out (Plates)

R.S.A. 4: Wall Frames

R.S.A. 5: Ceiling Joists and Headers

R.S.A. 6: Common Rafters

R.S.A. 7: Hip Rafters, Hip Jack Rafters

R.S.A. 8: Valley and Valley Jack Rafters

R.S.A. 9: Sheathing

Unit IV - Exterior Trim (Optional)

Job 1: Lay out and Construct a Window Frame

Job 2: Lay out and Construct a Door Frame

Job 3: Set a Window and Door Frame

Job 4: Set a Sash

Job 5: Hang and Lock a Door

Job 6: Hang Finished siding

R.S.A. 1: Window and Door Frames

R.S.A. 2: Setting Frames

R.S.A. 3: Hanging and Locking Doors

R.S.A. 4: Setting Sash

R.S.A. 5: Siding

ELECTRICITY

Unit I - Bell Wiring (Required)

Job 1: Install a door bell or chime

R.S.A. 1: Care and use of hand tools

R.S.A. 2: Principles of electric circuit sketching

R.S.A. 3: Wire connections and soldering

Unit II - Indicating Instruments (Required)

Job 1: Connect a voltmeter, ammeter

R.S.A. 1: Principles of Meters

R.S.A. 2: Care of meters

R.S.A. 3: Reading a watt hour meter

Course Outline (Continued)

Unit III - Wiring to Existing Circuits (Optional)

Job 1: Install one light, one S.P. switch and receptacle using No. 12 nonmetallic sheath cable (Have Students make Sketch)

- R.S.A. 1: Introduction to National Electric Code R.S.A. No. 9 Book I Unit I
- R.S.A. 2: Polarity identification of systems and circuits R.S.A. No. 4 Book III Unit I
- R.S.A. 3: Selection of wire size and current carrying capacity Book I Unit III R.S.A. 7
- R.S.A. 4: Circuit sketching
- R.S.A. 5: Determine connected load
- R.S.A. 6: Types of Fasteners R.S.A. 7 Book I Unit I
- R.S.A. 7: Non-metallic cable wiring R.S.A. 8 Book III Unit I

Unit IV - Wiring to New Circuits (Optional)

Job 1: Install one porcelain flush chain receptacle, one pendant light with type C lamp cord on lighting circuit and receptacle outlet on an appliance circuit (Have students make sketch)

- R.S.A. 1: Types of fuses and circuit breakers and their use. R.S.A. 8 Book I Unit III
- R.S.A. 2: Circuit planning
- R.S.A. 3: Circuit sketching
- R.S.A. 4: Determining illumination
- R.S.A. 5: Types of boxes, box covers, and methods of installation R.S.A. 3 Book III Unit I

Unit V - Wiring Between Buildings (Optional)

Job 1: Install one light using two three-way switches from house to barn (Have students make sketch)

- R.S.A. 1: Determining number of conductors in conduit or tubing
- R.S.A. 2: Grounding
- R.S.A. 3: Current carrying capacity of conductors run in free air or in conduit or tubing
- R.S.A. 4: Calculation and use of charts in determining tensile strength and voltage drop.
- R.S.A. 5: Types of service brackets and wire holders and their use
- R.S.A. 6: N.E.C. requirements on outside wiring

Course Outline (Continued)

Unit VI - Wiring (Meter Pole) (Optional)

Job 1: Install a three wire meter service and a two wire feeder between pole and barn and 3 wire feeder between pole and dwellings (Have students make sketch)

R.S.A. 1: Determine service conductor and switch sizes  
R.S.A. 2: Locating the meter pole  
R.S.A. 3: Branch circuits and service entrance

Unit VII - Motors (Required)

Job 1: Disassemble, clean and reassemble split phase motor

R.S.A. 1: Simple motor  
R.S.A. 2: Principle of split phase motor

Unit VIII - Motors (Optional)

Job 1: Mount and connect a split phase dual-voltage reversible motor 110V or 220 V

R.S.A. 1: Calculation of pulley sizes  
R.S.A. 2: Determine H.P. of motor to do a job  
R.S.A. 3: Principle of capacitor motors  
R.S.A. 4: Methods of equipment grounding

Unit IX - Motors (Optional)

Job 1: Disassemble, clean and reassemble repulsion motor and reverse

R.S.A. 1: Principle of repulsion motors  
R.S.A. 2: Principle of 3 phase motor  
R.S.A. 3: Principle of wound rotor motor

Unit X - Motors (Required)

Job 1: Trouble shooting on motors and motor controllers

R.S.A. 1: Types and operating principles of motor Controller

MACHINE SHOP

Unit I - Lathe

Job 1: Turn a Shaft

Course Outline (Continued)

Unit I - Lathe (Continued)

- Job 2: Turn a Threading Blank
- Job 3: Threading a Blank
- Job 4: Drilling
- Job 5: Boring
- Job 6: Internal Threads

- R.S.A. 1: Principles of the Lathe
- R.S.A. 2: Lathe Holding Devices
- R.S.A. 3: Cutting Tools
- R.S.A. 4: Knurling
- R.S.A. 5: Shoulder Turning and Necking
- R.S.A. 6: Filing and polishing
- R.S.A. 7: Drilling and Reaming
- R.S.A. 8: Tapping
- R.S.A. 9: Screw Threads Standard
- R.S.A. 10: Internal Threading

PLUMBING

- Job 1: Setting grade lines for house sewer
- Job 2: Thread and connect pipe
- Job 3: Cut, bend, and flare copper tubing
- Job 4: Cutting and joining cast iron pipe

- R.S.A. A: Background of the plumbing trade
- R.S.A. 1: Cesspools
- R.S.A. 2: Septic tanks
- R.S.A. 3: Purification and disposal of discharged effluent, the filter trench and the distribution field
- R.S.A. 4: Tools and procedures for cutting and threading pipe
- R.S.A. 5: Tools, methods, and fittings for joining copper tubing
- R.S.A. 6: Materials used for sewage and vent pipes: Terra cotta; cast iron; galvanized and copper pipe

SMALL ENGINES

Unit I - Basic Repair Skills

- R.S.A. 1: Fastening Devices, Calipers, and Thread Gages
- Job 1: Identify Bolts and Nuts
- R.S.A. 2: Drills, Taps, and Dies
- R.S.A. 2A: Tools
- Job 2: Make Internal Thread Block and Studs

Course Outline (Continued)

Unit I - Basic Repair Skills (Continued)

R.S.A. 3: Installing Studs and Removing Broken Studs  
Job 3: Remove a Broken Stud

R.S.A. 4: Soldering  
Job 4: Make a Solder Joint

R.S.A. 5: Hand Tools and How to Use  
Job 5: Identify Hand Tools

R.S.A. 6: Tubing  
Job 6: Single Flare Copper Tubing

Unit II - Engine Overhaul

R.S.A. 1: Starting, Stopping, and Storing Small Engines  
Job 1: Start and Stop Engine (4 Stroke Cycle)

R.S.A. 2: Principles of Operation, Four Stroke Cycles  
and Two Stroke Cycle

R.S.A. 3: Cooling and Lubrication  
Job 2: Clean Air Cooling System (Any Make)

R.S.A. 4: Operation, Repair, Timing, and Adjustment of  
Valves  
Job 3: Reface Valves and Seats (Head and Valve Cover  
Removed)

Job 4: Remove Old and Install New Valve Seat Insert  
Job 5: Counterbore Cylinder for Valve Seat Insert  
(Valves Removed)

R.S.A. 5: Cylinders  
R.S.A. 5A: The Micrometer  
Job 6: Hone Cylinder For Oversize Piston, (Aluminum)  
Job 7: Hone Cylinder For Oversize Piston, (Cast Iron)

R.S.A. 6: Pistons, Rings and Pins  
Job 8: Remove and Replace Connecting Rod, Piston, and  
Piston Rings (Briggs & Stratton 8 BH)  
Job 9: Remove and Replace Connecting Rod, Piston, and  
Piston Rings, (Briggs and Stratton Model 8)

R.S.A. 7: Connecting rods, Crank and Camshafts, Bearings  
and Seals

Job 10: Check and Align Connecting Rod  
Job 11: Remove and Replace Connecting Rod, Piston, and  
Piston Rings, (Clinton Model VS 800)

Job 12: Remove Old and Install New Crankshaft Seals and  
Bearings (Plain Type)



Course Outline (Continued)

Unit II - Engine Overhaul (Continued)

- Job 13: Overhaul Engine, Briggs & Stratton 8 B-H with Rewind Starter
- Job 14: Complete Engine Overhaul, Briggs & Stratton Model 8
- Job 15: Complete Engine Overhaul, Clinton Model VS 800
- Job 16: Complete Engine Overhaul, Clinton Model AVS 400
- Job 17: Complete Engine Overhaul, Lauson Model V17
- Job 18: Complete Engine Overhaul, Power Products Type 710112

Unit III - Starting Mechanisms

- R.S.A. 1: Manual Starters
- Job 1: Disassemble and Repair, Rewind Starter, Briggs & Stratton 8 B-H
- Job 2: Disassemble and Repair Rewind, Clinton A VS 400 (Fairbanks Morse)
- Job 3: Repair Recoil Starter, Lauson V-17

Unit IV - Magneto Ignition

- R.S.A. 1: Magnetism and Electricity
- Job 1: Repair Ignition System, Briggs & Stratton 8 B-H
- Job 2: Repair Ignition System, Briggs & Stratton Model 8
- Job 3: Repair Ignition System, Clinton VS 800
- R.S.A. 2: Magneto Construction and Operation
- Job 4: Repair Ignition System, Clinton AVS-400
- Job 5: Repair Ignition System, Lauson V-17, Wico Magneto
- Job 6: Repair Ignition System, Power Products Type 710112, Phelon Magneto

Unit V - Fuel System

- R.S.A. 1: Carburetion and Fuel System
- Job 1: Repair and Adjust Carburetor and Governor, Briggs & Stratton 8 BH (Float Type)
- Job 2: Repair and Adjust Carburetor and Governor, Briggs and Stratton, Model 8 (Gravity Feed Carburetor, Air Vane Governor)

Course Outline (Continued)

Unit V - Fuel System (Continued)

- R.S.A. 2: Governors
- R.S.A. 3: Repair and Adjust Carburetor and Governor,  
Clinton VS 800 (Carter Type N)
- Job 4: Repair and Adjust Carburetor and Governor,  
Clinton A VS 400; Clinton Carburetor Type  
LMG - 13
- Job 5: Repair and Adjust Carburetor and Governor,  
Lauson V 17, Walbro Carburetor
- Job 6: Repair and Adjust Carburetor and Governor,  
Power Products Type 710112, Tillotson  
Carburetor Series MT 33A
- Job 7: Repair Diaphragm Carburetor, Tillotson HL  
Series

Unit VI - Applications

- R.S.A. 1: Types and Construction of Outboard Lower  
Units
- Job 1: Repair Water Pump and Gear Case Assembly,  
Johnson Model CD
- Job 2: Repair Water Pump and Gear Case, Scott-Atwater  
5 H.P., 1954 and up (Powerhead Removed)
- R.S.A. 2: Small Engine Clutches
- Job 3: Remove and Repair Centrifugal Clutch, Clinton  
Direct

TRACTOR MAINTENANCE AND REPAIR

Unit I - Preventive Maintenance Fundamentals

PACKAGE #1

- Math 1 The Steel Rule
- R.S.A. 1 Fastening Devices, Calipers, and Thread Gages
- Job 1 Identify Bolts and Nuts

PACKAGE #2

- R.S.A. 2 Drills, Taps, and Dies
- Job 2 Make Internal Thread Block and Studs
- J.I.S. 1 Tools (For use with Job 2)



Course Outline (Continued)

Unit I - Preventive Maintenance Fundamentals - (Continued)

PACKAGE #3

R.S.A.	3	Installing Studs and Removing Broken Studs
Job	3	Remove a Broken Stud
Math	2	Addition and Subtraction of Scale Measurements

PACKAGE #4

R.S.A.	4	Soldering
Job	4	Make a Solder Joint

PACKAGE #5

Job	5	Start, Operate and Stop Tractor
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PACKAGE #6

R.S.A.	5	Hand Tools and How to Use
Job	6	Identify Hand Tools

PACKAGE #7

R.S.A.	6	Tire Service
Job	7	Remove, Repair, and Replace Tire and Tube

PACKAGE #8

Math	3	Addition and Subtraction of Whole Numbers
R.S.A.	7	Lubrication
Job	8	Lubricate Tractor

PACKAGE #9

R.S.A.	8	Lubricating Oils and Oil Filters
Job	9	Drain, Flush, Refill Crankcase and Service Oil Filter

PACKAGE #10

R.S.A.	9	Battery Service
Job	10	Service a Battery

PACKAGE #11

R.S.A.	10	Cooling Systems
Job	11	Flush Cooling System

Course Outline (Continued)

Unit II - Front Axle and Steering Gear

PACKAGE #12

R.S.A.	11	Front Wheel Service
Job	12	Remove, Repack, and Adjust Front Wheel Bearings
Math	4	Multiplication in Whole Numbers

PACKAGE #13

R.S.A.	12	Front Axles
Job	13-B	Set Toe-In (Ford, 8N)
Job	13-C & E	Set Toe-In (Farmall, Super-A and Case, LA)
Math	5	Division of Whole Numbers

PACKAGE #14

R.S.A.	13	Reamers and Reaming
Job	14-B	Renew Spindle Bushings (Ford, 8N)
Job	14-C	Rebush Steering Knuckles (Farmall, Super-A)
Job	14-E	Renew Kingpin Bushings (Case, LA)
Job	15-B	Renew Axle Pin Bushing (Ford, 8N)
Job	15-C	Renew Axle Pivot Shaft Bushings (Farmall Super-A)
Job	15-E	Renew Axle Pivot Shaft Bushing (Case L.A.)
Math	6	Changing Fractions

PACKAGE #15

Job	16-A	Renew Vertical Spindle Bushing (John Deere-B)
Job	17-A	Repair Roll-O-Matic (John Deere-B)
Job	18-D	Renew Front Wheel Felt Washers (Allis-Chalmer, W.C.)
R.S.A.	14	Steering Gears and Adjustment
Job	19-A	Adjust Steering Gear (John Deere-B)

PACKAGE #16

Job	19-B	Adjust Steering Gear (Ford, 8N)
Job	19-D	Adjust Steering Gear (Allis-Chalmers, W.C.)
Job	19-E	Adjust Steering Gear (Case, LA)
R.S.A.	15	Tie Rod Ends and Universal Joints
Job	20-B	Overhaul Steering Gear (Ford, 8N)
Job	20-C	Overhaul Steering Gear (Farmall, Super-A)
Job	20-E	Overhaul Steering Gear (Case, LA)

Unit III - Cooling System

PACKAGE #17

R.S.A.	16	Radiators and Radiator Service
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Course Outline (Continued)

Unit III - Cooling System (Continued)

PACKAGE #17

Math	7	Addition and Subtraction of Fractions
Job	21	Remove and Repair Radiator

PACKAGE #18

R.S.A.	17	Fans and Fan Drives
Math	8	Multiplication of Fractions
Job	22-A	Repair Fan Assembly (John Deere-B) (Hood and Radiator Removed)
Job	22-C	Repair Fan Assembly (Farmall Super-A)
Job	23-A	Check and Repair Ventilator Pump (John Deere-B) (Fan Assembly Removed)

PACKAGE #19

Math	9	Division of Fractions
R.S.A.	18	Water Pumps
Job	24-B	Remove, Repair, and Replace Water Pump (Ford 8N)
Job	24-D	Remove, Repair, and Replace Water Pump (Allis-Chalmers WC)
Job	24-E	Remove, Repair, and Replace Water Pump (Case LA)

PACKAGE #20

R.S.A.	19	Thermostats, Shutters, and Temperature Gages
Job	25	Remove, Check, and Replace Thermostat (Radiator Drained)

Unit IV - Attachments

PACKAGE #21

R.S.A.	20	Power Take-offs and Drawbars
Job	26-C	Remove, Repair, and Replace Power Take-Off (Farmall, Super-A) (To be performed with Job No. 27-C)
Job	26-D	Remove, Repair, and Replace Power Take-Off (Allis-Chalmers W.C.)
Job	26-E	Remove, Repair, and Replace Power Take-Off (Case LA)

PACKAGE #22

Math	10	Pulley Speeds and Sizes
R.S.A.	21	Belt Pulleys and Pulley Speeds

FARM MECHANICS  
Trade Preparatory

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Course Outline (Continued)

PACKAGE #22

- Job 27-B Remove, Repair, and Replace Belt Pulley (Ford 8N)
- Job 27-C Remove, Repair, and Replace Belt Pulley (Farmall, Super-A) (To be performed with Job No. 26-C)
- Job 27-D Remove, Repair, and Replace Belt Pulley (Allis-Chalmers W.C.)

PACKAGE #23

- Math 11 The Decimal System
- R.S.A. 22 Lighting Systems, Lights and Light Switches
- Job 28-A Install Lighting Attachment (John Deere-B)
- Job 28-B Install Lighting System (Ford 8N)
- Job 28-C Install Lighting System (Farmall, Super-A)
- Job 28-D Install Lighting System (Allis-Chalmers, W.C.)
- Job 28-E Install Lighting System (Case, LA)

PACKAGE #24

- Math 12 Addition and Subtraction of Decimal Fractions
- R.S.A. 23 Basic Hydraulic Principles and General Power Lift Operation
- R.S.A. 23-A Powr-Trol and Power Lift (John Deere, B)\*
- R.S.A. 23-B Hydraulic Control Unit (Case L.A.)
- R.S.A. 23-C Touch-Control System (Farmall, Super A)
- R.S.A. 23-E Hydraulic Control Unit (Case L.A.)
- Job 26-B Remove and Repair Power Take-Off Shaft (Ford 8N)
- Job 29-A Repair Powr-Trol (John Deere-B)
- Job 29-B Remove, Repair, and Replace Hydraulic Control (Ford, 8N)
- Job 29-C Remove, Repair, and Replace Touch Control (Farmall, Super-A)
- Job 29-D Remove, Repair, and Replace Mechanical Lift (Allis-Chalmers, W.C.)
- Job 29-E Remove, Repair, and Replace Hydraulic Control Unit (Case, LA)

Unit V - Rear Axle, Final Drive, and Brakes

PACKAGE #25

- Math 13 Multiplication of Decimal Fractions
- R.S.A. 24 Bearings, Seals and Closures
- Job 30-C Remove, Repair and Reassemble Final Drive (Farmall, Super-A)
- Job 30-D Disassemble, Repair, and Reassemble Final Drive (Allis-Chalmers, WC)
- R.S.A. 25 Tractor Final Drives
- Job 33-D Remove, Repair, and Replace Brakes (Allis Chalmers W.C.) (Final Drive Disassembled)

Course Outline (Continued)

PACKAGE #26

- R.S.A. 26 Types of Rear Axles and Their Adjustment  
Job 31-A Remove and Renew Rear Axle Bearings or Seals  
(John Deere-B)  
Job 31-B Remove and Renew Rear Axle Bearings or Seals  
(Ford 8N)  
Job 31-E Remove and Renew Rear Axle Bearings or Seals  
(Case, LA)

PACKAGE #27

- Math 14 Division of Decimals  
R.S.A. 27 Brakes  
Job 32-A Adjust Brakes (John Deere-B)  
Job 32-B Adjust Brakes (Ford 8N)  
Job 32-C Adjust Brakes (Farmall, Super-A)  
Job 32-D Adjust Brakes (Allis Chalmers, WC)  
Job 32-E Adjust Brakes (Case, LA) (Mechanical-Internal  
Expanding)  
Job 32-E Adjust Hydraulic Brakes (Case, LA) (Minor  
Adjustment)  
Job 32-E Adjust Hydraulic Brakes (Case, LA) (Major  
Adjustment)  
Job 32-X Adjust Disc Type Brakes (All Models)  
Job 33-A Remove, Repair, and Replace Brakes (John  
Deere-B)  
Job 33-B Disassemble, Repair and Reassemble Brakes  
(Ford 8N) (Wheel and Brake Drum Removed)  
Job 33-E Remove, Repair, and Replace Brakes (Case, LA)  
Job 33-E Disassemble, Repair, and Reassemble Brakes  
(CASE, LA) (Hydraulic Brakes)  
Job 33-X Remove, Repair, and Replace Disc Brakes  
(All Models)

Unit VI - Differential

PACKAGE #28

- Math 15 Changing Common Fractions to Decimals  
Math 16 The Micrometer  
R.S.A. 28 Ring Gear and Pinion Adjustments  
Job 34-C Adjust Ring Gear and Pinion (Farmall, Super-A)  
(Final Drive Removed)  
Job 34-D Adjust Ring Gear Backlash (Allis-Chalmers, WC)  
R.S.A. 29 Differential Construction and Operation  
Job 35-A Remove, Repair, and Reassemble Differential  
(John Deere-B)  
Job 35-B Remove, Repair, and Reassemble Differential  
(Ford, 8-N)

Course Outline (Continued)

PACKAGE #28

- Job 35-C Remove, Repair, and Reassemble Differential (Farmall, Super-A)
- Job 35-D Remove, Repair and Reassemble Differential (Allis Chalmers, WC.)
- Job 35-E Remove, Repair, and Reassemble Differential (Allis Chalmers, WC.)
- Job 36-D Disassemble, Repair, and Reassemble Torque Tube (Allis-Chalmers, WC.)
- R.S.A. 30 Getting and Holding a Job

Unit VII - Transmissions

PACKAGE #29

- R.S.A. 31 Transmission Shifter Mechanism
- Job 37-A1 Disassemble, Repair, and Reassemble Shifter Mechanism (John Deere-B) (Differential Removed) (Serial No. B-9600 to B-201000)
- Job 37-A2 Disassemble, Repair, and Reassemble Shifter Mechanism (John Deere-B) (Differential Removed) (Serial No. B-201000 and Up)
- Job 37-B Disassemble, Repair, and Reassemble Shifter Mechanism (Ford, 8-N) (Differential Removed)
- Job 37-C Remove, Repair, and Replace Shifter Mechanism (Farmall, Super-A)
- Job 37-D Remove, Repair, and Replace Shifter Mechanism (Allis-Chalmers, WC.)
- Job 37-E Repair and Replace Shifter Mechanism (Case, LA.) (Differential Removed)

PACKAGE #30

- Math 17 Gear Ratios
- R.S.A. 32 Transmissions
- R.S.A. 32-A1 Transmission Construction and Operation (John Deere-B, Serial No. B-96000 to B-201000)
- Job 38-A1 Disassemble, Repair, and Reassemble Transmission (John Deere-B) (Differential and Shifter Mechanism Removed) (Serial No. B-96000 to B-201000)
- R.S.A. 32-A2 Transmission Construction and Operation (John Deere-B) (Serial No. 201000 and up)
- R.S.A. 38-A2 Disassemble, Repair, and Reassemble Transmission (John Deere-B) (Serial No. B-201000 and Up) (Differential and Shifter Mechanism Removed)



Course Outline (Continued)

PACKAGE #30

- R.S.A. 32-B Transmission Construction and Operation  
(Ford, 8-N)
- Job 38-B Disassemble, Repair, and Reassemble  
Transmission (Ford, 8-N) (To be Performed  
with Job No. 37-B)
- Job 38-C Disassemble, Repair, and Reassemble Trans-  
mission (Farmall, Super A.) (Differential  
and Torque Tube Removed)
- Job 38-D Remove, Repair, and Replace Transmission  
(Allis-Chalmers, W.C.) (Differential and  
Torque Tube Removed)
- Job 38-E Disassemble, Repair, and Reassemble  
Transmission (Case, LA) (Differential and  
Shifter Mechanism Removed)
- Job 26-A Remove and Repair Power Shaft (John Deere-B)

Unit VIII - Clutches

PACKAGE #31

- R.S.A. 33 Types of Clutches; Care and Operation
- Math 18 Simple Percentage
- Job 39-A Repair and Adjust Clutch, Farmall A, B, or C
- Job 39-B Repair and Adjust Clutch, Allis-Chalmers WD
- Job 39-C Repair and Adjust Clutch, Ford 8N
- Job 39-D Repair and Adjust Clutch, John Deere B

Unit IX - Fuel Systems

PACKAGE #32

- R.S.A. 34 Fuel Supply and Replace Carburetor
- Job 40-A Remove, Repair, and Replace Carburetor,  
Farmall A, B, or C
- Job 40-B Remove, Repair, and Replace Carburetor, Allis-  
Chalmers WD.
- Job 40-C Remove, Repair, and Replace Carburetor, Ford 8N
- Job 40-D Remove, Repair, and Replace Carburetor, John  
Deere B

PACKAGE #33

- R.S.A. 35 Governors, Types and Operations
- Math 19 Discount
- Job 41-A Remove, Repair, and Replace Governor, Farmall  
A, B, or C
- Job 41-B Remove, Repair, and Replace Governor, Allis  
Chalmers WD



Course Outline (Continued)

PACKAGE #33

- Job 41-C Remove, Repair, and Replace Governor, Ford 8N
- Job 41-D Remove, Repair, and Replace Governor, John Deere B

Unit X - Magneto Ignition

PACKAGE #34

- R.S.A. 36 Magnetism and Electricity
- R.S.A. 37 Magneto Construction and Operation
- Job 42-A Disassemble, Repair and Reassemble Magneto, Farmall A, B, or C

PACKAGE #35

- R.S.A. 38 Impulse-Starter Couplings; Timing and Care of the High-Tension Magneto
- Math 20 Personal Checks and Drafts
- Job 42-B Disassemble, Repair and Reassemble Magneto, Allis-Chalmers WD
- Job 42-C Disassemble, Repair and Reassemble Magneto, (John Deere B)

Unit XI - Battery Ignition

PACKAGE #36

- R.S.A. 39 Types and Requirements of Battery Ignition Systems
- Job 43-B Disassemble, Repair, and Reassemble Distributor, Allis-Chalmers WD

PACKAGE #37

- R.S.A. 40 Coils, Condensers, Contact Points, Distributor, and Spark Plugs
- Job 43-C Disassemble, Repair, and Reassemble Face Mounted Distributor, Ford 8N
- Job 43-D Disassemble, Repair, and Reassemble Angle Mounted Distributor, Ford 8N
- Job 43-E Remove, Clean, Adjust and Replace Spark Plugs

Unit XII - Cranking Motors

PACKAGE #38

- R.S.A. 41 Operating Principles of Cranking Motors and Drives
- Math 21 Work Orders and Bills
- Job 44 Remove, Overhaul, and Replace Cranking Motor

Course Outline (Continued)

Unit XIII - Generators

PACKAGE #39

R.S.A.	42	Generator Construction and Operation
Job	45	Remove, Disassemble, Repair and Replace a Generator

PACKAGE #40

R.S.A.	43	Cutout Relays and Step-voltage Controls
Math	22	Keeping Accounts
Job	46	Remove, Check, and Adjust Step-Voltage Control

Unit XIV - Engines

PACKAGE #41

R.S.A.	44	Engine Fundamentals
Job	47	Clean Engine With Cold or Hot Degreasing Solution
Job	48	Remove and Replace Expansion Plug

PACKAGE #42

R.S.A.	45	Valve Types and Construction
R.S.A.	46	Valve Mechanisms
Job	49	Reface Rocker Arms

PACKAGE #43

R.S.A.	47	Valve Service
Job	50	Remove, Clean, and Replace Rocker Arms
Job	51	Grind Valves on I-Head Engine
Job	52	Grind Valves on L-Head Engine

PACKAGE #44

R.S.A.	48	Pistons, Piston Rings, Cylinders and Sleeves
Job	58	Remove Old and Install New Piston Rings
Job	59	Remove Old and Install New Cylinder Sleeves, Dry Type
Job	60	Remove and Install Cylinder Sleeve, Wet Type
Job	61	Rebore Cylinder
Job	62	Hone Cylinder and Fit Piston

PACKAGE #45

R.S.A.	49	Piston Pins, and Bushings, Connecting Rods, Crankshaft and Main Bearings
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Course Outline (Continued)

PACKAGE #45

- Job 53 Remove Old and Fit New Piston Pins and Bushings
- Job 54 Install New Ring Gear on Flywheel
- Job 55 Adjust Connecting Rod Bearings With Engine in Tractor, John Deere (Shim Type)
- Job 56 Install New Connecting Rod Bearings With Engine in Tractor (Insert Type)
- Job 57 Adjust Main Bearings, John Deere B

PACKAGE #46

- R.S.A. 50 Engine Lubrication Systems
- Job 63 Remove, Inspect, and Replace Oil Pump

PACKAGE #47

- Job 64 Overhaul Engine Completely (Except John Deere)

PACKAGE #48

- Job 65 Overhaul Engine Completely, John Deere B

WELDING

Unit I - Welding - Oxyacetylene

- Job No. 1: Safety Rules for Oxyacetylene Welding  
Mathematics  
Related-Technical Information
- Job No. 2: Set Up Oxyacetylene Welding Equipment  
Mathematics  
Related-Technical Information
- Job No. 3: Regulate Oxygen and Acetylene Pressure and Light a Torch  
Mathematics  
Related-Technical Information
- Job No. 4: The Cutting Torch and Flame Cutting Steel  
Mathematics  
Related-Technical Information
- Job No. 5: Flat Welding Without Filler Rod  
Mathematics  
Related-Technical Information

Course Outline (Continued)

- Job No. 6: Flat Welding with Filler Rod (All Joints)  
Mathematics  
Related-Technical Information
- Job No. 7: Vertical Welding (All Joints)  
Mathematics  
Related-Technical Information
- Job No. 8: Vee Butt (Overhead)  
Mathematics  
Related-Technical Information
- Job No. 8A: Fillet Weld (Overhead)  
Mathematics  
Related-Technical Information
- Job No. 9: Butt Weld, Forehand - Backhand (Horizontal)  
Mathematics  
Related-Technical Information
- Job No. 10: Bronze Weld Steel  
Mathematics  
Related-Technical Information
- Job No. 11: Bronze Weld Cast Iron  
Mathematics  
Related-Technical Information
- Job No. 12: Low Temperature Brazing  
Mathematics  
Related-Technical Information
- Job No. 13: Welding Aluminum  
Mathematics  
Related-Technical Information
- Job No. 14: Special Projects  
Mathematics  
Related-Technical Information
- Job No. 15: Butt Weld Pipe (Roll)  
Mathematics  
Related-Technical Information
- Job No. 16: Butt Weld Pipe Fixed Position Bellhole  
Mathematics  
Related-Technical Information
- Job No. 17: Butt Weld Pipe Fixed Position Horizontal  
Mathematics  
Related-Technical Information

Course Outline (Continued)

Unit II - Welding - Arc

- Job No. 1: Shop Safety  
Blueprint Reading  
Mathematics  
Related-Technical Information
- Job No. 2: Use and Care of Equipment  
Blueprint Reading  
Mathematics  
Related-Technical Information
- Job No. 3: Stringer Beads (Flat)  
Blueprint Reading  
Mathematics  
Related-Technical Information
- Job No. 4: Continuous Stringer Beads  
Blueprint Reading  
Mathematics  
Related-Technical Information
- Job No. 5: Weave Beads  
Blueprint Reading  
Mathematics  
Related-Technical Information
- Job No. 6: Tee Joint (Flat)  
Blueprint Reading  
Mathematics
- Job No. 7: Outside Corner Joint (Flat)  
Blueprint Reading  
Mathematics  
Related-Technical Information
- Job No. 8: V-Butt Joint - Back-up Strip (Flat)  
Blueprint Reading  
Related-Technical Information
- Job No. 9: V-Butt Joint - Open (Flat)  
Blueprint Reading  
Related-Technical Information
- Job No. 10: Lap Joint (Horizontal)  
Blueprint Reading  
Related-Technical Information
- Job No. 11: Tee Joint - Stringer Beads (Horizontal)  
Blueprint Reading  
Related-Technical Information

Course Outline (Continued)

- Job No. 12: Tee Joint - Weave Bead (Horizontal)  
Blueprint Reading  
Related-Technical Information
- Job No. 13: Stringer Beads on Horizontal Plate (Horizontal)  
Blueprint Reading  
Related-Technical Information
- Job No. 14: V-Butt Joint - Back-up Strip (Horizontal)  
Blueprint Reading
- Job No. 15: V-Butt Joint - Open (Horizontal)  
Blueprint Reading
- Job No. 16: Stringer Beads - Travel Down (Vertical)  
Blueprint Reading  
Related-Technical Information
- Job No. 17: Lap Joint - Travel Down (Vertical)  
Blueprint Reading  
Related-Technical Information
- Job No. 18: Stringer Beads, Travel Up (Vertical)  
Blueprint Reading
- Job No. 19: Weave Beads, Vertical Position  
Blueprint Reading
- Job No. 20: Lap Joint, Vertical Position  
Blueprint Reading
- Job No. 21: Tee Joint, Vertical Position  
Blueprint Reading
- Job No. 22: Outside Corner Joint, Vertical Position (Vertical)  
Blueprint Reading
- Job No. 23: V-Butt Joint - Back-up Strip (Vertical)  
Blueprint Reading
- Job No. 24: V-Butt Joint - Open (Vertical)  
Blueprint Reading
- Job No. 25: Stringer Beads (Overhead)  
Blueprint Reading
- Job No. 26: Weave Beads
- Job No. 27: Lap Joint (Overhead)

Course Outline (Continued)

- Job No. 28: Tee Joint - Stringer Beads (Overhead)
- Job No. 29: Tee Joint, Overhead - Weaved Bead Technique
- Job No. 30: V-Butt Joint, Backup Strip (Overhead)
- Job No. 31: V-Butt Joint, Open (Overhead)
- Job No. 32: Butt Joint, Pipe (Roll Weld)  
Layout  
Related-Technical Information
- Job No. 33: Butt Joint Pipe (Fixed Position)  
Layout  
Related-Technical Information
- Job No. 34: Butt Weld Pipe (Horizontal Position)  
Layout  
Related-Technical Information
- Job No. 35: Two Piece 90° Turn  
Layout  
Related-Technical Information
- Job No. 36: Tee Weld  
Layout  
Related-Technical Information
- Job No. 37: "Y" In Fixed Position  
Layout



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The Fundamental Electrical Course was published in 1955 and revised in 1962. It is available in the following forms:

Book I

Related Study Assignments Units I & II  
Jobs Units I & II

Book II

Related Study Assignments Units III, IV, & V  
Jobs Units III, IV, & V

Book III

Related Study Assignments Unit VI  
Jobs Unit VI

Book IV

Related Study Assignments Units VII, VIII, & IX  
Jobs Units VII, VIII, & IX

Book V

Related Study Assignments Units X & XI  
Jobs Units X & XI

Mathematics

All Math is included in the Related Study Assignment  
Books I - V

Test Books

Book I	Units I & II
Book II	Units III, IV, & V
Book III	Unit VI
Book IV	Units VII, VIII, IX, X, & XI

Answer Book

Complete for tests and math

The following instructor's aids are available:

Progress Chart  
Individual folder type

The references for the Electrician Course are the following

Title	Source
Hausmann, Erich SWOOPE'S LESSONS IN PRACTICAL ELECTRICITY	D. Van Nostrand Co., Inc., 120 Alexandria Street Princeton, New Jersey
Loper, Orla E. DIRECT CURRENT FUNDAMENTALS	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York

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References (Continued)

Title	Source
Uhl, Dunlap, and Flynn INTERIOR ELECTRIC WIRING AND ESTIMATING--RESIDENTIAL	American Technical Society 848 East 58th Street Chicago 37, Illinois
Richter, H. P. PRACTICAL ELECTRICAL WIRING	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
THE NATIONAL ELECTRICAL CODE	The National Board of Fire Underwriters 85 John Street New York 38, New York
Cooke, Nelson M. BASIC MATHEMATICS FOR ELECTRONICS	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
DUAL ELEMENT FUSE CATALOG	Bussman Mfg. Division University at Jefferson St. Louis 7, Missouri
250) Manual - Instruction Sheets 700) --Rotating Electrical Machinery (Navy Common Core) --Crow Rotating Electric Machine - Zitzman	Universal Scientific Co., Inc. 1312 S. Thirteenth Street Vincennes, Indiana
Duff, John R. BASIC ELECTRICITY 2 (A. C. FUNDAMENTALS)	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
Nadon, John M. and Gelmine, Bert J. INDUSTRIAL ELECTRICITY	D. Van Nostrand Co., Inc. 120 Alexander Street Princeton, New Jersey
WESTINGHOUSE LIGHTING HANDBOOK	Westinghouse Electric Supply Company 1299 Northside Drive, N. W. Atlanta 2, Georgia
Rasch, William Edward PRACTICAL ELECTRICAL MATHEMATICS	D. C. Heath and Co. 285 Columbus Avenue Boston 16, Massachusetts

References (Continued)

Title	Source
Rosenberg, Robert ELECTRIC MOTOR REPAIR	Holt, Rinehart and Winston, Inc. 383 Madison Avenue New York 17, New York
Crouse, William H. AUTOMOTIVE ELECTRICAL EQUIPMENT	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
DELCO-REMY, 12 Volt Electrical Equipment for 1958 Cars, DR-5210	Delco-Remy Division General Motors Corporation Anderson, Indiana
STEEL ELECTRICAL RACEWAYS	American Iron and Steel Institute 150 East Forty-second Street New York 17, New York
Abbott, Arthur L. THE NATIONAL ELECTRICAL CODE HANDBOOK	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
Graham, Kennard C. NATIONAL ELECTRICAL CODE AND BLUEPRINT READING	American Technical Society 848 East 58th Street Chicago 37, Illinois
CHROMALOX ELECTRIC COMFORT HEATING	Edwin L. Wiegand Co. 7500 Thomas Blvd. Pittsburgh 8, Pa.
NEMA MANUAL FOR ELECTRIC HOUSE HEATING	National Electrical Mfgs. Association 115 East 44 Street New York 17, New York
ELECTRICAL BLUEPRINT READING AND SKETCHING-RESIDENTIAL	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
Crouse, William H. ELECTRICAL APPLIANCE SERVICING	McGraw-Hill Book Co. 330 West 42nd Street New York 36, New York
Gibbs, J. B. TRANSFORMER PRINCIPLES AND PRACTICE	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York

References (Continued)

Title	Source
ELECTRICAL METERMAN'S HANDBOOK Terms and Definitions	Edison Electric Institute 420 Lexington Avenue New York 17, New York
Braymer, Daniel H. and Roe, A. C. REWINDING SMALL MOTORS	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
Veinott, Cyril G. FRACTIONAL HORSEPOWER ELECTRIC MOTORS	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
Heine, Dunlap, and Jones HOW TO READ ELECTRICAL BLUEPRINTS	American Technical Society 848 East 58th Street Chicago 37, Illinois
Van Valkenburgh, Nooger, Neville, Inc. BASIC SYNCHROS AND SERVOMECHANISMS	John F. Rider Publisher, Inc. 116 West 14th Street New York 11, New York
Crow, Leonard R. LEARNING ELECTRICITY AND ELECTRONICS EXPERIMENTALLY	Educational Publishers, Inc. St. Louis, Missouri
GENERAL DESCRIPTION FOR D. C. VARIABLE DRIVE	Fidelity Instrument Corporation 100 E. Boundary Avenue York, Pennsylvania
DESCRIPTION OF OPERATION AND SERVICE INSTRUCTIONS, MODEL F-29B SPEED REGULATOR	Fidelity Instrument Corporation 100 E. Boundary Avenue York, Pennsylvania

A detailed outline of the Fundamental Electrical Course follows.

Unit I - Fundamental Theory of Electricity

R.S.A.	1	Care and Use of Hand Tools and Equipment
Job	1	Identify Hand Tools in Your Shop
R.S.A.	2	Hack Saws, Hack Saw Blades, Vise, and Ruler
Job	2	Cut Conduit and Wire to Specified Length
R.S.A.	3	Electron Theory and Static Charges
Job	3	Prove Laws of Electrical Charges and Effects of Static Charges
R.S.A.	4	Electric Current and Electron Flow
Job	4	Produce Electron Movement and Current Flow

Unit I - Fundamental Theory of Electricity (Continued)

- |        |    |   |
|--------|----|---|
| R.S.A. | 5  | Voltage, Current, Resistance and Conductance                                    |
| R.S.A. | 6  | Properties of Magnets and Magnetic Fields                                       |
| Job    | 6  | Determine the Polarity of Magnets and the Existence of Magnetic Field           |
| R.S.A. | 7  | Electromagnetism and Electromagnets   |
| Job    | 7A | Perform Oersted's Experiment of Magnetic Effects of an Electric Current         |
| Job    | 7B | Make an Electromagnet and Study its Characteristics                             |
| R.S.A. | 8  | Means of Developing Electromotive Forces  |
| Job    | 8  | Produce E.M.F. by Three Different Methods                                       |
| R.S.A. | 9  | Primary Cells   |
| Job    | 9  | Testing Voltage and Amperage of a Dry Cell, and Methods of Connecting Dry Cells |
| R.S.A. | 10 | Secondary Cells   |
| Job    | 10 | Construct and Test Secondary or Storage Cells                                   |

Unit II - Principles of Direct Current

- |        |    |  |
|--------|----|--|
| R.S.A. | 1A | Care and Use of Power Operated Tools   |
| Job    | 1A | Installing Fasteners in Masonry Construction                                       |
| R.S.A. | 1B | Types of Fasteners   |
| Job    | 1B | Installing Fasteners in Masonry Construction                                       |
| R.S.A. | 2  | Tap Drill Figures  |
| Job    | 2  | Lay Out Plate For Drilling   |
| Job    | 3  | Figure Tap Drill Sizes   |
| Job    | 4  | Drilling   |
| Job    | 5  | Taps and Tapping   |
| R.S.A. | 3  | Types of Wire and Cable and The Use of The American Wire Gauge and Micrometer      |
| R.S.A. | 4  | Wire Connections and Soldering   |
| Job    | 6  | Make a Rat-tail Splice, a Tap Splice and a Fixture Splice                          |
| Job    | 7  | Make a Western-Union Splice and a Cable Splice                                     |
| Job    | 8  | Soldering Wires in Terminal Lugs   |
| R.S.A. | 5  | Mathematics - Ohm's Law--Series Circuits   |
| Job    | 9  | Construct a Series Circuit and Take Voltage and Ammeter Readings                   |
| R.S.A. | 6  | Mathematics - Ohm's Law--Parallel Circuits   |
| Job    | 10 | Construct a Parallel Circuit and Take Voltage and Ammeter Readings                 |
| R.S.A. | 7  | Mathematics - Ohm's Law--Series Parallel Circuits                                  |
| Job    | 11 | Construct a Series Parallel Circuit and Take Voltage and Ammeter Readings          |
| R.S.A. | 8  | Circuit Sketching, Cells in Series, Parallel and Series-Parallel                   |
| Job    | 12 | Connect Cells in Series, Parallel and Series and Parallel and Take Voltage Reading |



Unit II - Principles of Direct Current (Continued)

- |        |     |  |
|--------|-----|--|
| R.S.A. | 9   | Low Voltage Signal Circuits  |
| Job    | 13A | Connect 2 Vibrating Bells in Parallel, Using 1 Push Button and 2 Cells in Series   |
| Job    | 13B | Wire a Department Return-Call Bell Circuit, Using Single-Contact Push Buttons  |
| Job    | 13C | Connect and Install a Department Return-Call System Using Four Department Bells and One Master Bell With Eight Single-Contact Push Buttons |
| Job    | 13D | Connect a Six-Point Manual-Reset Annunciator to be Controlled from Six Single-Contact Push Buttons   |
| R.S.A. | 10  | Fuses and Circuit Breakers   |
| Job    | 14  | Test for Blown Fuses in Fuse Panel, Using a Test Socket and a Lamp Bulb  |
| R.S.A. | 11  | Power in Direct Current Circuits   |
| Job    | 15  | Determine the Power in a D.C. Circuit  |
| R.S.A. | 12  | Principles of Dynamo-Electric Machines   |
| Job    | 16  | Construct a Direct Current Generator   |
| R.S.A. | 13  | Problems Concerning Conductors   |
| Job    | 17A | Learn How Electrical Resistance Varies With the Kind of Material Used  |
| Job    | 17B | Learn How the Resistance of a Conductor Varies With Its Length   |
| Job    | 17C | Measure Voltage Drop in a Circuit  |
| R.S.A. | 14  | Direct Current Meters  |
| Job    | 18  | Construct an Experimental Ammeter  |

Unit III - Principles of Alternating Current

- |        |    |  |
|--------|----|--|
| Math   | 1  | Introduction to Trigonometry   |
| Math   | 2  | Trigonometric Functions  |
| Math   | 3  | Tables of Functions  |
| Math   | 4  | Solution of Right Triangles  |
| Math   | 5  | Periodic Functions   |
| Math   | 6  | Elementary Plane Vectors   |
| R.S.A. | 1A | Alternating Currents and Voltages  |
| R.S.A. | 1B | Care and Use of Portable Meters and Indicating Devices                     |
| Job    | 1  | Assemble, Connect and Test Run a Single Phase Alternator                   |
| R.S.A. | 2  | Alternating Current Meters   |
| Job    | 2  | Convert a D'Arsonval Meter Movement to Measure Alternating Current Voltage |
| R.S.A. | 3A | Study the Oscilloscope   |
| Job    | 3A | Operation of the Oscilloscope  |
| R.S.A. | 3B | Study Voltage Calibrator   |
| Job    | 3B | Use of the Voltage Calibrator  |
| R.S.A. | 4  | Resistance and Power in AC Circuits  |
| Job    | 4  | Watts and Power Factor Resistor Circuits                                   |
| R.S.A. | 5A | Inductance   |
| R.S.A. | 5B | Inductance in AC Circuits  |

Unit III - Principles of Alternating Current (Continued)

- Job 5 Watts and Power Factor of Inductor Circuits
- R.S.A. 6A Capacitance
- R.S.A. 6B Capacitance in AC Circuits
- Job 6 Watts and Power Factor of Capacitors
- R.S.A. 7A Impedance in AC Series Circuits
- Job 7A Watts and Power Factor of Series Inductance, Capacitance Circuit
- R.S.A. 7B Resistance, Inductance and Capacitance in AC Parallel Circuits
- Job 7B Watts and Power Factors of Parallel Inductance, Capacitance Circuit
- R.S.A. 7C Series-Parallel AC Circuits
- R.S.A. 8 Study the Capacitance or Condenser Tester
- Job 8 Capacitor Testing
- Job 9A Inductor-Resistor Phase Shift Circuit
- Job 9B Capacitor-Resistor Phase Shift Circuit
- R.S.A. 10A Power Factor
- R.S.A. 10B Power in Single Phase Circuits
- Job 10A Check Power Factor of a Single Phase Load (Leading and Lagging)
- Job 10B Check Power Factor of Single Phase Motor Full Load
- R.S.A. 11 Principles of Alternating Current
- Job 11A Connect and Meter the Current and Voltage in a 3-Phase Star Connected Circuit
- Job 11B Connect and Meter the Current and Voltage in a 3-Phase Delta Connected Circuit
- R.S.A. 12 Power Transformers
- Job 12 Assemble, Connect and Test Input and Output of Single Phase Transformer
- R.S.A. 13 Instrument Transformers
- Job 13A Connect Potential Transformers for Metering
- Job 13B Connect Current Transformers for Metering

Unit IV - Lighting

- R.S.A. 1 Facts About Lighting
- Job 1 Measure Light With Light Meter
- R.S.A. 2 Types of Lamps
- Job 2 Construct Single-Lamp Fluorescent Light
- R.S.A. 3 Computing Electric Light and Power Bills
- Job 3 Read Meter and Calculate Bill

Unit V - Motors and Generators

- R.S.A. 1 Direct Current Generators
- Job 1 Construct a Separately-Excited D.C. Generator
- R.S.A. 2 Direct Current Motors
- Job 2 Construct a Series-Wound D.C. Generator and Motor



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Unit V - Motors and Generators (Continued)

- |        |    |  |
|--------|----|--|
| Job    | 3  | Construct a Shunt Wound D.C. Generator and Motor   |
| Job    | 4  | Disassemble and Clean Commercial Type Shunt Motor or Generator                           |
| Job    | 5  | Construct a Compound Wound Generator and Motor   |
| Job    | 6  | Disassemble and Clean Commercial Type Compound Wound Generator or Motor                  |
| R.S.A. | 3  | The Growler  |
| Job    | 7  | Armature Testing With a Growler  |
| R.S.A. | 3A | Generators   |
| Job    | 8  | Test a Compound Motor for Grounds and Open Circuit                                       |
| Job    | 9  | Experiment on Resistance Testing of a D.C. Compound Motor                                |
| Job    | 10 | Determine the horsepower of A.C. and D.C. Electric Motors                                |
| R.S.A. | 4  | Principles of Alternating Current Motors   |
| Job    | 11 | Construct an A.C. Induction Motor--Four Pole--Split Phase--Starting Winding              |
| Job    | 12 | Construct an A.C. Split Phase Motor-Capacitor Start, Also Capacitor Start, Capacitor Run |
| Job    | 13 | Construct an A.C. Shaded Pole Motor  |
| Job    | 14 | Construct a 3-Phase Induction Motor, 6-Pole, 12-Coil Field                               |
| R.S.A. | 5  | Automotive Generator Service   |
| Job    | 15 | Disassemble and Repair Automotive Generator  |

Unit VI - Wiring Methods

- |        |   |  |
|--------|---|--|
| R.S.A. | 1 | General Provisions of the National Electrical Code   |
| Job    | 1 | Connect a Light Controlled by a Single Pole Toggle Switch  |
| R.S.A. | 2 | General Requirements for Wiring Methods  |
| Job    | 2 | Connect Two Lights in Series Controlled by a Single Pole Toggle Switch. Exposed Knob Method                                  |
| R.S.A. | 3 | Types of Boxes, Box Covers, Box Extensions and Methods of Installation   |
| Job    | 3 | Connect Two Lights in Parallel Controlled by a Single Pole Toggle Switch. Exposed Knob Method.                               |
| R.S.A. | 4 | Polarity Identification of Systems and Circuits  |
| Job    | 4 | Connect a Ceiling Light Controlled by a Single Pole Toggle Switch. Concealed Knob and Tube.                                  |
| R.S.A. | 5 | Types of Cables and Fittings   |
| Job    | 5 | Connect One Ceiling Light and One Receptacle, Each Controlled by a Single Pole Toggle Switch, Concealed Knob and Tube        |
| R.S.A. | 6 | Branch Circuits and Service Entrance   |
| Job    | 6 | Install a Two Wire Service Entrance Using Two Wire Entrance Cable, a Socket Type Meter Base, and a Six Circuit-Breaker Panel |

Unit VI - Wiring Methods (Continued)

R.S.A.	7	Non-Metallic Cable or Romex Wiring
Job	7	Install Two Circuits Using Non-Metallic Cable (Romex)
R.S.A.	8	Armored Cable Wiring
Job	8A	Install a 3-Wire Service Entrance, Use 3-Wire Entrance Cable, Socket Type Meter Base and a Six-Circuit Breaker Panel
Job	8B	Install 3 Circuits Using Armored Cable (BX)
R.S.A.	9	Schematic Diagraming and Wiring Plans
Job	9	Install Two Circuits Using Romex Cable
R.S.A.	10	Installing Surface Metal Raceway
Job	10A	Installing Surface Metal Raceway Install No. 200 Wiremold From Existing Baseboard Receptacle, to Single Pole Toggle on Wall to Control Ceiling Light
Job	10B	Installing Surface Metal Raceway Install No. 1900 Wiremold From Existing Baseboard Receptacle to an Extension of 5 Receptacles
R.S.A.	11	Bending Conduit and Tubing with Hand Benders
Job	11	Bend Conduit and Electrical Metallic Tubing
R.S.A.	12	Installing Conduit
Job	12A	Install a 3-Wire Service Entrance Using 1" Conduit and a Six-Circuit Breaker Panel
Job	12B	Installing Conduit Install 2 Circuits Using 1/2" Conduit
R.S.A.	13	Methods of Pulling Conductors in Raceways
Job	13	Pull Wires into Conduit and Connect
R.S.A.	14	Use of N.E.C. Tables for Calculating the Number of Conductors in Conduit or Tubing
Job	14	Install a Ceiling Light Controlled by Two 3-Way Switches. Install Two 120-Volt Receptacles. Install a Three Wire 240-Volt Circuit
R.S.A.	15	Building Structures and Architectural Symbols
Job	15	Install 1/2" E.M.T. and Wire
R.S.A.	16	Wiring in Hazardous Locations
Job	16	Hazardous and Non-hazardous Installation
R.S.A.	17	Installing Wireways, Busways, Auxiliary Gutters, and Cellular Metal Raceways
Job	17	Installing Square-Duct and Wiring Using a Square-Duct Wiring Trough. Install From a Main Switch 3 Motors of Different Sizes Each Controlled by a Separate Switch
R.S.A.	18	Garages, Service Stations, and Bulk Storage Plants
Job	18	Wiring in Inflammable Areas
R.S.A.	19	Installation Practice of Lighting Fixtures
Job	19	Wire With Romex
R.S.A.	20	Practical Blueprint Reading
Job	20	Submit Bid on Single-Family Dwelling
R.S.A.	21	Application of Home Heating
Job	21	Electric Bathroom Heater Installation

Unit VI - Wiring Methods (Continued)

- |        |     |  |
|--------|-----|--|
| R.S.A. | 22  | Remote Control Switching   |
| Job    | 22  | Wiring Remote Controlled Lighting Low Voltage Switching  |
| R.S.A. | 23  | Cooking Appliances   |
| Job    | 23  | Install Electric Range Circuit, Energize and Trouble Shoot   |
| R.S.A. | 24  | Electric Hot Water Heaters and Gas Furnace Controls  |
| Job    | 24  | Install Low-Voltage-Control Circuit for Gas Furnace  |
| R.S.A. | 25  | Metering Polyphase Circuits With and Without Instrument Transformers   |
| Job    | 25A | Connect Voltmeter and Ammeter With the Voltmeter Reading Line Voltage Only   |
| Job    | 25B | Connect Wattmeter in a Single-Phase Circuit  |
| R.S.A. | 26  | Illumination Design Data for Interiors   |
| Job    | 26  | Measure Length and Width of Wiring Booth and Figure the Number and Size of Fixtures Needed to Produce Approximately 60 Foot Candles of Lighting, 4-Feet From the Floor |
| R.S.A. | 27  | Calculations for Illuminating an Industrial Shop   |
| Job    | 27  | Plan and Lay Out Lighting in Shop Building by the "Lumen Method of Calculation."   |
| R.S.A. | 28  | Calculating Wiring for an Industrial Shop  |
| Job    | 28  | Submit Bid for Complete Wiring of the Two School Shops   |
| R.S.A. | 29  | Calculating, Wiring, and Illumination for Paint Shop and Finishing Room  |
| Job    | 29  | Submit Bid for Complete Wiring of Paint Shop and Finishing Room  |
| R.S.A. | 30  | Characteristics and Working Principles of Fluorescent Lamps  |
| Job    | 30  | Reconnect a Two-Lamp (40 Watts Each) Fluorescent Pre-heat Type Fixture   |
| R.S.A. | 31  | Circuit Sketching - Fluorescent Lamps  |
| Job    | 31  | Reconnect a Two-Lamp (40 Watts Each) Instant Start Fluorescent Type Fixture  |
| R.S.A. | 32  | N.E.C. Requirements for Lighting Fixtures, Signs and Outline Lighting  |
| Job    | 32  | Calculate Wiring for Light and Power for Grocery Store   |
| R.S.A. | 33  | Estimating Material for Roughing-in a Single Family Dwelling   |
| Job    | 33  | Estimate Cost of Material and Labor for Family Dwelling  |

Unit VII - Direct Current Motor Control

- |        |   |  |
|--------|---|--|
| R.S.A. | 1 | Manual Starting Rheostats for Direct Current Motors                          |
| Job    | 1 | To Study the Connections and Operation of a Three-Terminal Starting Rheostat |

Unit VII - Direct Current Motor Control (Continued)

- |        |    |  |
|--------|----|--|
| Job    | 2  | Install and Connect Shunt Motor, Safety Switch and Three-Terminal Starting Box. All Wiring to be Done in Rigid Conduit                                       |
| Job    | 3  | Wire and Connect a Compound D.C. Motor to a Three-Terminal Starting Box and Safety Switch. All Wiring is to be in Rigid Conduit According to Your Own Layout |
| Job    | 4  | Wire and Connect a Compound D.C. Motor to a Four-Terminal Starting Box and Safety Switch. All Wiring is to be in E.M.T. According to Your Own Layout         |
| R.S.A. | 2  | Manual Speed Controllers for Direct Current Motors   |
| Job    | 5  | Manual Speed Controller Connections and Operation  |
| Job    | 6  | Load - Speed Test of a Shunt Motor   |
| Job    | 7  | Load - Speed Test of a Compound Motor  |
| Job    | 8  | Efficiency of a D.C. Motor   |
| R.S.A. | 3  | Drum Controllers   |
| Job    | 9  | Connect a Shunt Motor to a Three-Terminal Starting Rheostat and Reversing Switch   |
| Job    | 10 | Connect a Compound Motor to a Four-Terminal Starting Rheostat and Reversing Switch   |
| Job    | 11 | Connect a Shunt Motor to a Drum Reversing Switch   |
| Job    | 12 | Connect a Start-Stop Station to a D.C. Full Voltage Starter and Shunt Motor  |
| Job    | 13 | Connect Two Start-Stop Stations to a D.C. Full Voltage Starter and Shunt Motor   |
| Job    | 14 | Connect Three Start-Stop Stations to a D.C. Full Voltage Starter and a Compound Motor  |
| Job    | 15 | Automatic Acceleration of D.C. Motors  |
| Job    | 16 | Definite Time Method of Acceleration of a D.C. Motor   |
| Job    | 17 | Connect a Start-Stop Station to a Reduced Voltage Magnetic Starter and Compound Motor  |
| Job    | 18 | Connect a Reduced-Voltage Magnetic Starter Equipped With Dynamic Braking to a Compound Motor   |
| Job    | 19 | Automatic Acceleration With Dynamic Braking and Reversing  |
| R.S.A. | 4  | Automatic Motor Control  |

Unit VIII - Alternating Current Motors Controllers and Alternators

- |        |   |   |
|--------|---|---|
| R.S.A. | 1 | Insulating Materials and Wire   |
| Job    | 1 | Measure Thickness of Slot Insulation Paper and Wire Size Before and After Insulation has Been Removed |
| R.S.A. | 2 | Split Phase Motors  |
| Job    | 2 | Rewind and Test a Split-Phase Motor   |
| R.S.A. | 3 | Capacitor Motors  |
| Job    | 3 | Rewind and Test a Capacitor-Start Motor   |



Unit VIII - Alternating Current Motors Controllers and Alternators  
(Continued)

- |        |    |   |
|--------|----|---|
| R.S.A. | 4  | Current Relays  |
| Job    | 4  | Install and Connect a Current Relay   |
| R.S.A. | 5  | Voltage Relay   |
| Job    | 5  | Install and Connect a Voltage Relay   |
| R.S.A. | 6  | Repulsion Induction Motor   |
| Job    | 6  | Repair Repulsion-Induction Motors   |
| R.S.A. | 7  | Three-Phase Motors  |
| Job    | 7  | Rewind and Connect a Three-Phase Fractional Horsepower Motor                |
| R.S.A. | 8  | N.E.C. Specifications for Motors and Controllers                            |
| Job    | 8  | Calculate Wiring for Three-Phase Motor and Controller                       |
| R.S.A. | 9  | Wiring for Motors   |
| Job    | 9  | Installation of Magnetic Starter and Raceway for a 3 H.P. Three-Phase Motor |
| R.S.A. | 10 | Across-the-Line Magnetic Starters   |
| Job    | 10 | Wire and Connect Control for Installed Magnetic Starter and Motor           |
| R.S.A. | 11 | Reversing Magnetic Starter  |
| Job    | 11 | Install Wires and Connect Reversing Magnetic Starter                        |
| R.S.A. | 12 | Reduced Voltage Starter   |
| Job    | 12 | Wire and Connect Starting Compensator to Motor                              |
| R.S.A. | 13 | Drum, Two Speed and Quick Stop Controller                                   |
| Job    | 13 | Connect Wiring of Two Speed Controller to Motor                             |
| R.S.A. | 14 | Synchronous Drive and Indicating Systems                                    |
| Job    | 14 | Connect a Synchro Generator and Motor                                       |
| R.S.A. | 15 | Alternators   |
| Job    | 15 | Connect and Test a Three-Phase Alternator                                   |
| R.S.A. | 16 | Synchronizing and Phasing Alternators                                       |
| Job    | 16 | Phasing out and Connect Two Alternators in Parallel                         |
| R.S.A. | 17 | Calculating Necessary Data for Wiring Wound Rotor Motors                    |
| Job    | 17 | Connect Wiring of Wound Rotor   |

Unit IX - Transformer Principles and Practices

- |        |    |  |
|--------|----|--|
| R.S.A. | 1  | Power Transformers   |
| Job    | 1  | Build a Simple Transformer   |
| R.S.A. | 2  | Checking Polarity of Transformers  |
| Job    | 2  | Connect a Single Phase Transformer With Series-Parallel Secondary for Polarity Check                               |
| R.S.A. | 3  | Single Phase Transformer Connections   |
| Job    | 3A | Connect a Single Phase Transformer With Series-Parallel Secondary for Series Operation and Take Voltage Readings   |
| Job    | 3B | Connect a Single Phase Transformer With Series-Parallel Secondary for Parallel Operation and take Voltage Readings |

Unit EX - Transformer Principles and Practices (Continued)

- |        |    |   |
|--------|----|---|
| R.S.A. | 4  | Special Application of Transformers   |
| Job    | 4  | Connect Two Single Phase Transformers in Parallel and Take Voltage Readings   |
| Job    | 5  | Make a Sketch of a Common Type Single-Phase Distribution Transformer Used as a Booster  |
| R.S.A. | 5  | Three Phase Transformer Connections   |
| Job    | 6  | Connect Three Single Phase Transformers for 3-Phase, Four Wire, Wye-Wye Operation, and Take Voltage Readings  |
| Job    | 7  | Connect 3 Single Phase Transformers for 3 Phase, Four Wire, Wye-Delta Operation and Take Voltage Readings   |
| Job    | 8  | Connect 3 Single-Phase Transformers For 3-Phase, Four Wire; Delta-Delta Operation and Take Voltage Readings   |
| Job    | 9  | Connect 3 Single-Phase Transformers for 3 Phase, Four Wire, Delta-Wye Operation and Take Voltage Readings.  |
| Job    | 10 | Connect Two Single-Phase Transformers for 3-Phase Open Delta Operation and Take Voltage Readings  |
| R.S.A. | 6  | Metering Single Phase Circuits Without Instrument Transformers  |
| Job    | 11 | Make a Neat Sketch of a Type S, 3-Wire, Single Phase, Self-Contained Meter Connected to a Load Center. Identify the current and potential coils and their connections. Explain in writing the functions of the meter parts. |
| R.S.A. | 7  | Instrument Transformers   |
| Job    | 12 | Make a Sketch of a Potential Transformer Connected to a Voltmeter. Show a 20 to 1 Voltage Ratio and Explain all Parts on Your Sketch.   |
| R.S.A. | 8  | Metering Single Phase Circuits With Instrument Transformers   |
| Job    | 13 | Make a Neat Sketch of a Single Unit Current Transformer Connected to a Type S Meter Socket Metering a 3 Wire Line. Name All Parts on Your Sketch.   |
| Job    | 14 | Make a Sketch of a Three-Wire Single-Phase Service Being Metered Using Instrument Current Transformer For Both Type A and S Meters  |
| Job    | 15 | Make a Sketch of a Three Wire Line Using a 2 Wire Transformer   |
| R.S.A. | 9  | Metering Polyphase Circuits With and Without Instrument Transformers  |
| Job    | 16 | Make a Sketch of a Type S Meter Self-Contained, Measuring Energy in a Three Phase Delta Circuit. Show all Connections and Name All Coils  |

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Unit IX - Transformer Principles and Practices (Continued)

- Job 17 Make a Sketch and Show the Connections for a Polyphase Watt Hour Meter on a 3-Phase, 3-Wire Circuit, Using Both Instrument Current and Potential Transformers. Show Potential Instrument Transformers Connected Open Delta
- Job 18 Make a Sketch of Metering a 4-Wire Wye Circuit With a 3 Phase, 3 Element Meter. Show Potential Transformers Connected Wye-Wye. Name all Coils on Your Sketch.

Unit X - Fundamental Electronics

- R.S.A. 1 Vacuum Tubes as Rectifiers
- Job 1 Build and Study a Vacuum Tube Rectifier
- R.S.A. 2 Solid State Rectifiers
- Job 2 Construct a Selenium Rectifier Circuit
- R.S.A. 3 Rectifier Filters
- Job 3 Construct Filter for Rectifier
- R.S.A. 4 Triode Tube
- Job 4 Study Characteristics of Triode Tube
- R.S.A. 5 Operation Gas Filled Tube
- Job 5 Connect and Test a Three Phase Rectifier
- R.S.A. 6 Thyatron Tube
- Job 6 Test an Automatic Battery Charger
- R.S.A. 7 Photo-Cells and Controls
- Job 7 Connect and Test a Phototube Relay
- R.S.A. 8 Electronic Motor Controls
- Job 8 Connect and test an Electronic Control for D.C. Shunt Motor
- R.S.A. 9 Magnetic Amplifier Control in D.C.
- Job 9 Connect and Test Magnetic Motor Control for D.C. Shunt Motor
- R.S.A. 10 Magnetic Amplifier Control A.C.
- Job 10 Connect and Test Magnetic Amplifier for 3-Phase Motor Control
- R.S.A. 11 Amplidyne Drive System
- Job 11 Assemble an Amplidyne Drive System, Test and Operate

Unit XI - Welding and Cutting

- R.S.A. 1 Functions and Operating Principles of Oxy-acetylene, Regulators, Blowpipes, and Accessories
- Job 1 To Set Up Oxy-Acetylene Cutting Equipment
- R.S.A. 2 Setting Up Oxy-Acetylene Equipment
- Job 2 To Cut Steel Plate With Oxy-Acetylene Cutting Torch
- R.S.A. 3 Oxy-Acetylene Cutting
- Job 3 To Make Beads on Flat Plate Without Using Filler Rod
- R.S.A. 4 Oxy-Acetylene Welding
- Job 4 To Deposit Beads on Flat Plate Using Filler Rod



Unit XI - Welding and Cutting (Continued)

- |        |    |  |
|--------|----|--|
| Job    | 5  | To Make a Butt Weld on Mild Steel Strips in Flat Position                                    |
| Job    | 6  | To Bronze Weld Lap Joint of Mild Steel Strips  |
| Job    | 7  | To Silver Solder a Lap Joint of Copper   |
| Job    | 8  | To Strike an Arc and Deposit Beads on Flat Plate With Shielded-Arc Electrodes                |
| R.S.A. | 5  | Characteristics of Arc Welding   |
| Job    | 9  | To Deposit Weave Bead on Flat Plate Between Stringer Bead Using Straight Polarity Electrodes |
| R.S.A. | 6  | Types of Electrodes  |
| R.S.A. | 7  | Characteristics of Inert Gas Welding   |
| Job    | 10 | To Make a Tee Joint in Flat Position Using Straight Polarity Electrodes                      |
| Job    | 11 | To Start The Arc and Run Stringer Bead on Aluminum Plate                                     |
| Job    | 12 | To Deposit Stringer Beads on Flat Aluminum Plate Using Filler Metal                          |

Drafting is a study of the fundamental science or language of graphic expression. The exact thinking necessary to visualize or form mental pictures of intricate shapes, and describe them with lines, requires concentrated mental effort and application.

The course in Industrial Drafting herein outlined is designed for beginners, with aims to develop the ability of the student in the language and operations of drafting as well as present the latest developments in industry. The outline is offered in the form of instructional material and problems, for full understanding and ability in drafting comes only through application of principles in a variety of progressively difficult experiences.

The course as outlined covers thirty-one units with one hundred forty problems, to be completed in approximately 1560 clock hours of instruction. The outline has fifteen units with eighty problems in the first part, and sixteen units with sixty problems in the second part.

It is anticipated that the necessary mathematics which the student will require in the various assignments and problems will be incorporated in and taught concurrently with the practical exercises of each lesson.

The references for the Industrial Drafting are the following:

Title	Source
French and Svenson MECHANICAL DRAWING	McGraw-Hill Book Company 330 West 42nd Street New York 36, New York
Giesecke, Mitchell & Spencer TECHNICAL DRAWING	Macmillan Book Co. 60 5th Avenue New York 11, New York
French and Vierich ENGINEERING DRAWING	McGraw-Hill Book Co. 330 West 42nd Street New York 36, New York

A detailed outline of Industrial Drafting follows.

PART I - Instructional Material

- A. Basic Operations
  - 1. Select grade of pencil
  - 2. Sharpen a drawing pencil
  - 3. Make erasures
  - 4. Keep drawing clean
  - 5. Fasten paper to board
- B. Use of instruments
  - 1. Mark off measurements from scale
  - 2. Draw horizontal lines
  - 3. Draw vertical lines
  - 4. Lay out drawing sheet
  - 5. Draw to scale
  - 6. Draw inclined lines at standard angles
  - 7. Draw lines parallel to any given line
  - 8. Draw circles and arc
  - 9. Set off equal distances on a line with dividers
  - 10. Mark off angles from a protractor
- C. Lettering
- D. Geometric Construction
  - 1. Bisect a line
  - 2. Divide a line into any number of equal parts
  - 3. Bisect an angle
  - 4. Draw an arc tangent to non-parallel lines
  - 5. Draw an arc tangent to a straight line and an arc
  - 6. Draw an arc tangent to two arcs
  - 7. Draw a tangent to two unequal circles
- E. Freehand Sketching
  - 1. Sketch straight lines freehand
  - 2. Sketch circles and arcs
  - 3. Make a planning sketch
- F. Conventional Lines
  - 1. Represent visible outlines
  - 2. Represent hidden lines
  - 3. Show centers and axes by center lines
  - 4. Draw extension and dimension lines
  - 5. Make arrowheads
  - 6. Draw and identify line of section by cutting plane line
  - 7. Draw section lines
  - 8. Draw break lines
- G. Dimensioning and Notes
  - 1. Dimensioning a prism, hexagon, octagon, pyramid
  - 2. Dimension a circle
  - 3. Dimension a cylindrical part
  - 4. Dimension arcs
  - 5. Dimension a conical part
  - 6. Dimension round end shapes, round holes
  - 7. Dimension angles

- G. Dimensioning and Notes (Continued)
  - 8. Dimension an irregular curve, irregular part
  - 9. Dimension details of a part
  - 10. Dimension over-all size
  - 11. Dimension and specify tapers
  - 12. How to place notes
- H. Graphic Representation
  - 1. Determine the required views
  - 2. Center views on the sheet
  - 3. Draw the required views of a two-view drawing
  - 4. Develop a third view from two views
- I. Orthographic Projection
  - 1. Project the principal view of a prismatic solid
  - 2. Draw an auxiliary view
- J. Sectional Views
  - 1. Draw a full sectional view
  - 2. Draw a half sectional view
  - 3. Draw a partially broken out sectional view
- K. Detail and Assembly Drawings
  - 1. Make detail drawing
  - 2. Make assembly drawing from detail drawing
- L. Pattern Drawings
  - 1. Laying out square or rectangular pattern
  - 2. Laying out cylindrical pattern
  - 3. Laying out radial-shaped patterns
  - 4. Intersection of a cylinder with a flat plane
  - 5. Intersection of cylinders with like diameters
  - 6. Intersection of cylinders with unlike diameters
  - 7. Angle intersection of cylinders of like diameters
  - 8. Angle intersection of cylinders of unlike diameters
  - 9. Square and rectangular intersection
  - 10. Rectangular 90° duct elbow
  - 11. Transition of rectangular to round section
- M. Gears
  - 1. Make conventional working drawing of gears
- N. Fasteners
  - 1. American Standard 60° V-thread
  - 2. Bolt
  - 3. Stud
  - 4. Set screws
  - 5. Carriage bolts
  - 6. Machine bolts
  - 7. Stove bolts
  - 8. Wood screws
  - 9. Self-tapping screws
- O. Pictorial Drawings
  - 1. Isometric drawings
  - 2. Oblique drawings
  - 3. Cabinet drawing
  - 4. Parallel perspective drawings
  - 5. Angular perspective drawings

Part I - Problems

- A. Basic Operations
  - Plate 1. Fasten paper to board
- B. Use of instruments
  - Plate 1. Lay out drawing sheet
  - Plate 2. Horizontal lines, vertical lines, inclined lines at standard angles, lines parallel to any given line
  - Plate 3. Circles and arcs, set off equal distances on line with dividers, mark angles from protractor
- C. Lettering
  - Plate 4. Lettering
- D. Geometric Construction
  - Plate 5. Geometric Construction
- E. Freehand sketching
  - Plate 6. Sketch straight lines, sketch circles and arcs
  - Plates 7, 8, 9. Make a planning sketch
- F. Conventional lines
  - Plate 10. Conventional lines
- G. Dimensioning and Notes
  - Plate 11. Dimensioning
- H. Graphic Representation
  - Plates 12, 13, 14. Two view drawings
  - Plates 15, 16, 17, 18, 19. Develop third view from two views
- I. Orthographic Projection
  - Plates 20, 21, 22, 23. Project principal view of prismatic solid
  - Plates 24, 25, 26. Auxiliary view
- J. Sectional Views
  - Plates 27, 28, 29, 30, 31, 32. Sectional Views
- K. Detail and Assembly Drawings
  - Plates 33, 34, 35, 36, 37. Assembly drawings
  - Plates 38, 39. Make detail drawing
- L. Pattern Drawings
  - Plates 40, 41, 42. Laying out rectangular pattern
  - Plates 43, 44, 45. Intersection of cylinder with like diameter
  - Plates 46, 47. Rectangular 90° duct elbow
  - Plate 48. Transition of rectangular to round section
- M. Gears
  - Plates 49, 50. Spur gears
  - Plates 51, 52. Bevel gears
- N. Fasteners
  - Plate 53. American Standard 60° V-thread
  - Plate 54. Thread symbols
  - Plate 55. Machine bolt
  - Plate 56. Thread symbols

Part I - Problems (Continued)

- O. Pictorial Drawings
  - Plates 57, 58, 59, 60, 61, 62. Isometric drawings
  - Plates 63, 64, 65, 66, 67, 68. Oblique drawings
  - Plates 69, 70, 71, 72, 73, 74. Cabinet drawings
  - Plates 75, 76, 77, 78, 79. Parallel perspective drawings
  - Plates 80, 81, 82, 83, 84. Angular perspective drawings

Part II - Instructional Material

- A. Lettering
  - 1. Form single stroke letters and numerals
  - 2. Letter titles and notes
- B. Blueprint Reading
  - 1. Three-view drawings
    - a. Horizontal and vertical surfaces
    - b. Slanting surfaces
    - c. Hidden lines
    - d. Scales
  - 2. Two-view drawings
    - a. Curved surfaces
    - b. Fractional tolerance
    - c. Decimal tolerance
    - d. Angular tolerance
- C. Sectional Drawings
  - 1. Special types of sections
- D. Assembly Drawings
  - 1. Detail drawings
  - 2. Assembly drawings
  - 3. Bills of material
  - 4. Inking of drawings
- E. Orthographic Projection
  - 1. Auxiliary views
  - 2. Revolutions
- F. Intersections and Developments
  - 1. Intersection of a cylinder with a flat plane
  - 2. Angle intersection of cylinders of like diameters
  - 3. Square and rectangular intersection
  - 4. Intersection and development of two prisms
- G. Pipe, Fittings, and Valves
  - 1. Steel and wrought-iron pipe
  - 2. Cast-iron pipe
  - 3. Seamless brass and copper pipe
  - 4. Aluminum pipe
  - 5. Copper water tubes



- G. Pipe, Fittings, and Valves
  - 6. Pipe joints
  - 7. Globe valve
  - 8. Check valves
  - 9. Gate valves
  - 10. Piping drawings
  - 11. Dimensioning
- H. Pictorial Drawings
  - 1. Axonometric projection
    - a. Isometric
    - b. Dimetric
    - c. Trimetric
  - 2. Oblique projection
    - a. Oblique drawings
    - b. Reduction of length of receding axis
    - c. Four-center ellipse
    - d. Oblique sections
  - 3. Perspective
    - a. Simple perspective
    - b. Multiview perspective
    - c. Angular perspective
    - d. One-point perspective
    - e. Two-point perspective
    - f. Three-point perspective
- I. Shading
- J. Graphs
  - 1. Rectangular
  - 2. Composite
  - 3. Bar
  - 4. Area
  - 5. Circular
  - 6. Polar
  - 7. Organization
  - 8. Alignment
- K. Architectural Design
  - 1. General drawings
  - 2. Dimensioning
  - 3. Detail drawings
  - 4. Brick and tile construction
- M. Topographic Drawings
  - 1. Scale
  - 2. Conventional symbols
  - 3. Profiles
  - 4. Contours
  - 5. Maps from field notes
- N. Reproduction Process

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- O. Optional Drawings and Blueprint Reading
  - 1. Aeronautical drafting and blueprint reading
  - 2. Mechanical drafting and blueprint reading
  - 3. Electrical drafting and blueprint reading
  - 4. Welding drawings and blueprint reading
  - 5. To be selected by instructor

Part II - Problems

- A. Lettering
  - Plate 1. Inclined lettering; letter titles and notes
- B. Blueprint Reading
  - 1. Three-view drawings
    - Plate 2. Horizontal and vertical surfaces
    - Plate 3. Slanting surfaces
    - Plate 4. Hidden lines; scales
  - 2. Two-view drawings
    - Plates 5, 6, 7, 8. Curved surfaces
    - Fractional tolerances
    - Decimal tolerances
    - Angular tolerances
  - 3. One-view drawings
    - Plates 9, 10. One-view drawings
- C. Sectional Drawings
  - Plate 11. Removed sections
  - Plate 12. Offset sections
  - Plate 13. Conventional violations
- D. Assembly Drawings
  - Plate 14. Detail drawing
  - Plate 15, 16. Assembly drawings, bills of material, inking
  - of drawing
- E. Orthographic Projection
  - Plates 17, 18. Auxiliary views
  - Plates 19, 20. Revolutions
- F. Intersections and Developments
  - Plate 21. Intersection of cylinder with a flat plane
  - Plate 22. Angle intersection of cylinders of like diameters
  - Plate 23. Square and rectangular intersections
  - Plate 24. Intersection and development of two prisms
- G. Pipes, Fittings, and Valves
  - Plate 25. Single-line drawing of piping layout and system
  - Plate 26. Double-line drawing of piping layout and system
  - Plate 27. Single-line isometric drawing of piping layout
- H. Pictorial Drawing
  - 1. Axonometric projection
    - Plates 28, 29. Isometric
    - Plates 30, 31. Dimetric
    - Plates 32, 33. Trimetric

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2. Oblique projection
  - Plate 34. Oblique
  - Plate 35. Reduction of length of receding axis
  - Plate 36. Oblique with four-center ellipse
  - Plate 37. Oblique sections
3. Perspective
  - Plate 38. Simple perspective
  - Plate 39. One-point perspective
  - Plate 40. Two-point perspective
  - Plate 41. Three-point perspective
- I. Shading
  - Plates 42, 43. Shade lines
  - Plates 44. Surface shading
- J. Graphs
  - Plate 45. Rectangular graph
  - Plate 46. Circular graph
  - Plate 47. Organization chart
- K. Architectural Design
  - Plate 48. General plans and elevations
  - Plate 49. Detail drawings
- L. Structural Drawings
  - Plate 50. Wood construction
  - Plate 51. Steel and iron construction
  - Plate 52. Reinforced concrete, brick and tile construction
- M. Topographic Drawings
  - Plate 53. Profiles
  - Plate 54. Contours
  - Plate 55. Maps from field notes
- N. Reproduction Processes  
(Film and field trip)
- O. Optional Drawings and Blueprint Reading
  - Plates 56, 57. Select two of the following:
    1. Aeronautical drafting and blueprint reading
    2. Electrical drafting and blueprint reading
    3. Mechanical drafting and blueprint reading
    4. Welding drawing and blueprint reading
    5. To be selected by instructor

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The Industrial Engines Course was published in 1957 and revised in 1963-1964. It is available in the following forms:

Related Study Assignments and Job Sheets

Book I

- Unit I - Benchwork
- Unit II - Overhaul, Cleaning and Inspection
- Unit III - Auxiliary Equipment

Book II

- Unit IV - Diesel Fuel Systems
- Unit V - Welding

Test Book

- Book I - Units I - V

Answer Book

- Book I - Units I - V

The references for the Industrial Engines Course are the following:

Title	Source
ABC'S OF HAND TOOLS	General Motors Corporation General Motors Building 3044 West Grand Blvd. Detroit 2, Michigan
GENERAL REPAIR TOOLS FOR AUTO MECHANICS	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
Ludwig METALWORK TECHNOLOGY AND PRACTICE	McKnight and McKnight 109-111 West Market Street Bloomington, Illinois
Kates DIESEL AND HIGH COMPRESSION GAS ENGINES FUNDAMENTALS	American Technical Society 848 East 58th Street Chicago 37, Illinois
SERVICE MANUAL FOR THE DOCTOR OF MOTORS	Perfect Circle Corporation Hagerstown, Indiana
DOCTOR OF MOTORS, PRESCRIPTION FOR BETTER DIESEL ENGINE OVERHAUL	Perfect Circle Corporation Hagerstown, Indiana
Maleev, V. L. DIESEL ENGINE OPERATION AND MAINTENANCE	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York

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References: (Continued)

Title	Source
SERVICE MANUAL, SERIES 71	General Motors Corporation Detroit Diesel Engine Div. 13400 West Outer Drive Detroit 28, Michigan
SERVICE MANUAL, SERIES 110	General Motors Corporation Detroit Diesel Engine Div. 13400 West Outer Drive Detroit 28, Michigan
SERVICE MANUAL	Le Roi Company Milwaukee 14, Wisconsin
DR-324, Bulletin 1G-100, Bulletin 1G-125, Bulletin 1G-155	Delco-Remy Division General Motors Corporation Anderson, Indiana
AUTO-LITE ELECTRICAL EQUIPMENT MAINTENANCE AND OPERATION	The Electric Auto-Lite Co. The Parts and Service Division Toledo, Ohio
Delco-Remy Training Chart, Manual 5133H, and Manual 5133M	Delco-Remy Division General Motors Corporation Anderson, Indiana
Delco-Remy Bulletin 150 and Bulletins IC-100, ID-100 and ID-115	Delco-Remy Division General Motors Corporation Anderson, Indiana
Purvis, Jud ALL ABOUT SMALL GAS ENGINES	Goodheart-Willcox Co., Inc. 1322 South Wabash Avenue Chicago 5, Illinois
MOTOR SERVICE'S AUTOMOTIVE ENCYCLOPEDIA	Goodheart-Willcox Co., Inc. 1322 South Wabash Avenue Chicago 5, Illinois
TR-40, MAINTENANCE OF AUTOMOTIVE ENGINE COOLING SYSTEMS	Society of Automotive Engineers, Inc. 485 Lexington Avenue New York 17, New York
Frazee-Bedell TRACTORS AND CRAWLERS	American Technical Society 848 East Fifty-Eighth Street Chicago 37, Illinois

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References: (Continued)

Title	Source
Elementary Principles of Diesel Engine Governing, Bulletin 01012A	Woodward Governor Co. Rockford, Illinois
American Bosch Fuel Injection Equipment Maintenance Information	American Bosch Arma Corporation Springfield 7, Massachusetts
Roosa-Master Operation and Instruction Manual	Hartford Machine Screw Co. Hartford 2, Connecticut
Roosa-Master Service Manual, Test Specifications	Hartford Machine Screw Co. Hartford 2, Connecticut
Shop Manual PT Fuel System Bulletin 983334-D	Cummins Engine Co., Inc. Columbus, Indiana
Farmall and International Tractors Fuel Systems	International Harvester Co. 10400 West North Avenue Melrose Park, Illinois
SERVICEMEN'S REFERENCE BOOK (Caterpillar Service Manual)	Louisiana Machinery Co., Inc. P. O. Box 5544 Alexandria, Louisiana
FUEL EQUIPMENT SPECIFICATION CATALOGUE	American Bosch Arma Corporation Springfield 7, Massachusetts
Colored Chart on PSB Pump	American Bosch Arma Corporation Springfield 7, Massachusetts

A detailed outline of the Industrial Engines Course follows:

Unit I - Benchwork

R.S.A.	1	Hand Tools (General)
Job	1	Hand Tools (General)
R.S.A.	2	Measuring Devices
Job	2	Measure Crankshaft and Cylinder with Micrometers
R.S.A.	3	Fastening Devices
Job	3	Identify Bolt, Nuts, and Locks
R.S.A.	4	Abrasives
Job	4	Using Abrasives (Garnet Cloth, Emery or Sandpaper)
Job	4A	Dressing Bench Grinder Wheel
Job	4B	Reshape Screw Driver, Chisel, and Center Punch, Using Bench Grinder
R.S.A.	5	Files, Hacksaws, and Bench Vise
Job	5	Using the File, Hacksaw, and Bench Vise



Course Outline (Continued)

Unit I (Continued)

- R.S.A. 6 Twist Drills
- Job 6 Sharpen a Twist Drill and Make An Internal Thread Block With Studs
- R.S.A. 7 Threading Dies
- R.S.A. 7A Taps
- R.S.A. 7B Screw Extractors
- R.S.A. 7C "Sewing" Cracked Casting
- Job 7 Threading With Dies
- Job 7A Taps and Tapping
- Job 7B Removing Broken Stud
- Job 7C "Sewing" a Cracked Casting
- R.S.A. 8 Pipe Threads and Tubing
- Job 8 Tubing: Cutting, Flaring, Bending and Identifying Brass Fittings
- R.S.A. 9 Metal Shears
- R.S.A. 9A The Blow Torch
- R.S.A. 9B Soldering
- Job 9 Metal Shear
- Job 9A Filling and Lighting the Blow Torch
- Job 9B Splice Insulated Wire and Make a Solder Joint

Unit II - Overhaul, Cleaning and Inspection

- R.S.A. 1 Nomenclature and Terminology of Engine
- Job 1 Identify Engine Parts, Determine the Events in a Four and Two Stroke Cycle Engine
- R.S.A. 2 Piston Rings and Cylinder Honing
- Job 2 Piston Rings and Cylinder Honing
- R.S.A. 3 Crankshaft--Connecting Rod Main Bearings and Connecting Rod Bearings
- Job 3 Crankshaft Connecting Rod
- R.S.A. 4 Camshaft and Valve Train
- Job 4 Check Camshaft Bearings and Train
- R.S.A. 5 Part I Valve Timing - Gears and Gear Pullers
- Job 5 Part I Remove and Replace Timing Gears
- R.S.A. 5 Part II Valve Timing Diagrams 2 S.C. and 4 S.C.
- Job 5 Part II Making Valve Timing Diagrams
- R.S.A. 6 Cylinder Head Rebuilding
- Job 6 Cylinder Head Rebuilding
- R.S.A. 7 Flywheels
- Job 7 Flywheel
- R.S.A. 8 Lubricating Systems and Lube Oil Filter
- Job 8 Lubricating System

Course Outline (Continued)

Unit III - Auxiliary Equipment

- |        |    |  |
|--------|----|--|
| R.S.A. | 1  | Basic Principles of Electricity, Storage Battery, Battery Charger, and Volt Meter    |
| Job    | 1  | Servicing Battery  |
| R.S.A. | 2  | D-C Generators   |
| Job    | 2  | Disassemble and Reassemble Generator   |
| R.S.A. | 3  | Relays and Regulators for DC Generators  |
| Job    | 3  | Testing and Adjusting Regulators   |
| R.S.A. | 4  | Alternator Generators and Regulator Control  |
| Job    | 4  | Repair and Test Alternator Generator and Regulator Control                           |
| R.S.A. | 5  | Electric Cranking Motors Magnetic and Solenoid Switches and Series Parallel Switches |
| Job    | 5  | Cranking Motor Magnetic and Solenoid Switches and Series Parallel Switches           |
| R.S.A. | 6  | Ignition System  |
| Job    | 6  | Check and Test All Points in Ignition System   |
| R.S.A. | 7  | Carburetion and Fuel Pumps   |
| Job    | 7  | Clean and Rebuild Carburetor and Fuel Pump   |
| R.S.A. | 8  | Air Cleaners   |
| Job    | 8  | Servicing the Air Cleaner and Distribution System--Inspect Air Ducts                 |
| R.S.A. | 9  | Engine Cooling Systems   |
| Job    | 9  | Checking and Servicing Cooling Systems   |
| R.S.A. | 10 | Clutches   |
| Job    | 10 | Remove, Repair, Adjust, and Replace Clutch   |

Unit IV - Diesel Fuel Systems

- |        |   |   |
|--------|---|---|
| R.S.A. | 1 | Governors   |
| Job    | 1 | Disassemble and Reassemble Governor                                   |
| R.S.A. | 2 | General Motors Fuel Systems   |
| Job    | 2 | Tune up General Motor Engine  |
| R.S.A. | 3 | American Bosch Fuel System  |
| Job    | 3 | Tune up Engine With Bosch Fuel System                                 |
| R.S.A. | 4 | The Roosa-Master Fuel Pump  |
| Job    | 4 | Tune up Engine With Roosa-Master Fuel Pump                            |
| R.S.A. | 5 | Cummins (PT) Fuel System  |
| Job    | 5 | Tune Cummins Engine With (PT) Fuel System                             |
| R.S.A. | 6 | International Harvester Fuel System                                   |
| Job    | 6 | Tune International Harvester Engine                                   |
| R.S.A. | 7 | Caterpillar Fuel System   |
| Job    | 7 | Check Fuel Injection System (Caterpillar, all models)                 |
| R.S.A. | 8 | Rebuilding the Fuel Injection System for General Motors Diesel Engine |
| Job    | 8 | Rebuild and Test General Motors Fuel System                           |
| R.S.A. | 9 | Part I Bosch Fuel Systems   |

INDUSTRIAL ENGINES  
Trade Preparatory

C Page 6 of 7

Course Outline (Continued)

Unit IV - Diesel Fuel Systems

- |        |    |  |
|--------|----|--|
| Job    | 9  | Part I Rebuild, Test and Calibrate an American Bosch Fuel System   |
| R.S.A. | 9  | Part II Supply Pump  |
| Job    | 9  | Part II Rebuild, Test, and Calibrate an American Bosch Fuel System |
| R.S.A. | 9  | Part III The Bosch Fuel Nozzle                                     |
| Job    | 9  | Part III Servicing, Adjusting, and Testing the Bosch Nozzle        |
| R.S.A. | 9  | Part IV Bosch, PSB Pump  |
| Job    | 9  | Part IV Rebuild, Test, and Calibrate American Bosch Fuel System    |
| R.S.A. | 10 | Rebuilding the Roosa Master Fuel Pump                              |
| Job    | 10 | Rebuild and Test a Roosa Master Fuel Pump                          |
| R.S.A. | 11 | Rebuilding the Cummins (PT) Fuel System                            |
| Job    | 11 | Rebuild and Test a Cummins Fuel System                             |
| R.S.A. | 12 | Rebuilding International Harvester Fuel System                     |
| Job    | 12 | International Harvester Fuel System                                |
| R.S.A. | 13 | Trouble Shooting   |
| Job    | 13 | Trouble Shooting and Repair of Engine                              |

Unit V - Welding

- |        |    |  |
|--------|----|--|
| R.S.A. | 1  | Functions and Operating Principles of Oxy-Acetylene, Regulators, Blowpipes, and Accessories  |
| Job    | 1  | To Set Up Oxy-Acetylene Cutting Equipment  |
| R.S.A. | 2  | Setting Up Oxy-Acetylene Equipment   |
| Job    | 2  | To Cut Steel Plate With Oxy-acetylene Cutting Torch  |
| R.S.A. | 3  | Oxy-Acetylene Cutting  |
| Job    | 3  | To Make Beads on Flat Plate Without Using Filler Rod   |
| R.S.A. | 4  | Oxy-Acetylene Welding  |
| Job    | 4  | To Deposit Beads on Flat Plate Using Filler Rod  |
| Job    | 5  | To Make a Butt Weld on Mild Steel Strips in Flat Position                                    |
| Job    | 6  | To Bronze Weld Lap Joint of Mild Steel Strips  |
| Job    | 7  | To Silver Solder a Lap Joint of Copper   |
| Job    | 8  | To Strike an Arc and Deposit Beads on Flat Plate With Shielded-Arc Electrodes                |
| R.S.A. | 5  | Characteristics of Arc Welding   |
| Job    | 9  | To Deposit Weave Bead on Flat Plate Between Stringer Bead Using Straight Polarity Electrodes |
| R.S.A. | 6  | Types of Electrodes  |
| R.S.A. | 7  | Characteristics of Inert Gas Welding   |
| Job    | 10 | To Make a Tee Joint in Flat Position Using Straight Polarity Electrodes                      |

Course Outline (Continued)

Unit V (Continued)

- |     |    |   |
|-----|----|---|
| Job | 11 | To Start the Arc and Run Stringer Bead on Aluminum Plate            |
| Job | 12 | To Deposit Stringer Beads on Flat Aluminum Plate Using Filler Metal |

INDUSTRIAL INSTRUMENTS  
TECHNOLOGY  
Trade Preparatory

C Page 1 of 1

The Industrial Instruments Technology Course was published in 1966 and is composed of 5 books--Instructor's Guide, Student Workbook, Reference Book 1, Reference Book 2, and Reference Book 3.

A detailed outline of the Industrial Instruments Technology Course follows:

UNIT I - INDUSTRIAL INSTRUMENT TECHNOLOGY

- Section 1 Pressure-Measuring and Transmitting Instruments
- Section 2 Differential Pressure-Measuring
- Section 3 Velocity and Volumetric Measuring
- Section 4 Liquid-Level-Measuring Instruments
- Section 5 Temperature-Measuring Instruments
- Section 6 Viscosity and Specific-Gravity
- Section 7 pH and Redox Measuring Instruments
- Section 8 Gas Analyzers
- Section 9 Control Valves and Valve Positioners
- Section 10 Speed Measurement and Control
- Section 11 Repairing and Calibrating Controllers
- Section 12 Organization of Instrument Department for Processing Plants
- Section 13 Industrial Psychology and Personal Adjustment

UNIT II - PROCESS CONTROL TECHNOLOGY

- Section 1 Control Valves
- Section 2 Piston-Operated Control Valves
- Section 3 Differential Pressure Measurement
- Section 4 Temperature-Measuring Instruments
- Section 5 Pressure-Measuring Instruments
- Section 6 Flow-Measuring Instruments
- Section 7 Details of Flow-Measuring Instruments
- Section 8 pH and Oxidation Reduction Potential Measurement
- Section 9 Distillation and Fractionation Column Control
- Section 10 Various Control Techniques
- Section 11 Control of Various Processes
- Section 12 Reactors

The Machine Shop Course was published in 1955 and revised in 1962. It is available in the following forms:

Book I

Related Study Assignments Unit I  
Jobs Unit I

Book II

Related Study Assignments Units II & III  
Jobs Units II & III

Book III

Related Study Assignments Unit IV  
Jobs Unit IV

Book IV

Related Study Assignments Unit V  
Jobs Unit V

Mathematics

All Math is included in the Related Study Assignment  
Books I - IV

Test Books

Book I Units I, II, & III  
Book II Units IV & V

Answer Book

Complete for Units I - V

The following instructor's Aids are available:

Progress Chart  
Individual folder type

The references for the Machine Shop Course are the following:

Title	Source
Giachino and Feirer BASIC BENCH-METAL PRACTICE AND PRECISION MEASURING	Chas. A. Bennett Co., Inc. 237 N. Monroe Street Peoria, Illinois
BENCH WORK Machine Shop Series	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
MACHINE SHOP MATHEMATICS Machine Shop Series	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York



References (Continued)

Title	Source
Burghardt, Axelrod and Anderson MACHINE TOOL OPERATION, Part I	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Olivo, Thomas C. and Payne, Albert V. BASIC BLUEPRINT READING AND SKETCHING	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
Axelrod, Aaron MACHINE SHOP MATHEMATICS	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Oberg, Erik and Jones, F. D. MACHINERY'S HANDBOOK	The Industrial Press 93 Worth Street New York 13, New York
Burghardt, Axelrod, and Anderson MACHINE TOOL OPERATION, Part II	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
SHAPER WORK Machine Shop Series	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
LATHE WORK Machine Shop Series	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
MILLING MACHINE WORK Machine Shop Series	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York

A detailed outline of the Machine Shop Course follows:

Unit I - Bench and Floor

R.S.A.	1	Hand Hack Saw
Job	1	Make Two Screen Spacers
R.S.A.	2	Laying Out
Job	2	Make Lever Guides
R.S.A.	3	Files and Their Uses
Job	3	Make Two Templates
R.S.A.	4	Power Driven Saws
Job	4	Tool Post Wedge
R.S.A.	5	Abrasives
Job	5	Make a Cross Feed Pawl
R.S.A.	6	Offhand Grinding
Job	6	Make a Drill Gauge

Unit I - Bench and Floor (Continued)

R.S.A.	7	Cutting and Shearing
Job	7	Make Die Block Shims
R.S.A.	8	Drill Presses and Their Uses
Job	8	Make an Oil Hole Cover
R.S.A.	9	Cutting Internal Openings
Job	9	Transmission End Plate
R.S.A.	10	Finishing Metal Surfaces
Job	10	Make a Tool Post Wrench
R.S.A.	11	Metal Fasteners
Job	11	Make a Steel Square
R.S.A.	12	Bending and Shaping
Job	12	Make Inside Calipers
R.S.A.	13	Calipers
Job	13	Make Outside Calipers
R.S.A.	14	Taps and Tapping
Job	14	Make Tap Gauge
R.S.A.	15	Dies and Threading
Job	15	Make a Block With Studs
R.S.A.	16	How to Remove Broken Studs or Screws
Job	16	Drill Out Broken Studs
R.S.A.	17	Hand Forging
Job	17	Make an Adjustment Rod
R.S.A.	18	Soldering
Job	18	Make an Oil Pan
R.S.A.	19	Nonferrous Metals and Alloys
Job	19	Make an Oil Manifold
R.S.A.	20	Hand Reamers
Job	20	Install Bushings and Ream to Fit Shaft
R.S.A.	21	Producing and Processing Iron
Job	21	Make U Bolt and Strap
R.S.A.	22	Making Steel
Job	22	Make Motor Mount
R.S.A.	23	Rolling Mill
Job	23	Make an Eye Bolt
R.S.A.	24	Identification of Metals
Job	24	Make End Wrench
R.S.A.	25	Chisels
Job	25	Make A Cold Chisel
R.S.A.	26	Heat Treatment of Steel
Job	26	Make a Center Punch
R.S.A.	27	Screwdrivers
Job	27	Make an Offset Screw Driver
		Case Harden Wrench, Job 24
R.S.A.	28	Chipping
Job	28	Cam Lock Block
R.S.A.	29	Babbitting
Job	29	Babbitt Split Bearings

Unit II - Drill Press

R.S.A.	1	Use of the Drill Press
Job	1	Make a Spacer
R.S.A.	2	Work Holding Devices
Job	2	Guide Post Clamp
R.S.A.	3	Twist Drills and Drill Sizes
Job	3	Drill Stand, Letter Size
R.S.A.	4	Twist Drill--Terminology and Definitions
Job	4	Drill Stand Fractional Sizes
R.S.A.	5	Drill Chucks and Sleeves
Job	5	Drill and Wire Gage
Job	5B	Make a Drill Gauge
R.S.A.	6	Speeds and Feeds of a Drill Press
Job	6	Make a "C" Clamp
R.S.A.	7	Laying Out for Drilling
Job	7	Drawbar Extension
R.S.A.	8	Drill Grinding
Job	8	Machine Strap Clamp
R.S.A.	9	Other Drill Press Operations
Job	9	Spacer
R.S.A.	10	Laying Out and Drilling
Job	10	Mounting Plates
R.S.A.	11	Reamers
Job	11	Make Cross Head Pin and Lock
R.S.A.	12	Tapers
Job	12	Drill and Ream For Standard Taper Pins in Two Couplings and Shafts
R.S.A.	13	Laying Out Work
Job	13	Baffle Plate
R.S.A.	14	Boring
Job	14	Bore Large Hole
Job	15	Column Base

Unit III - Shaper

R.S.A.	1	Construction of the Shaper
Job	1	Machine a Block Square
R.S.A.	2	Operation of the Shaper
Job	2	Make an Offset Key
R.S.A.	3	Shaper Cutting Tools
Job	3	Make Two T-Slot Nuts
R.S.A.	4	Holding the Work
Job	4	Make a Chock Wedge
R.S.A.	5	Cutting Slots and Keyseats
Job	5	Cut an Open End Keyseat
Job	5A	Cut a Closed End Keyseat
Job	5B	Cut an Internal Keyseat
R.S.A.	6	Cutting Off
Job	6	Make Two Drill Press Vise Jaws

Unit III - Shaper (Continued)

R.S.A.	7	Speeds and Feeds
Job	7	Make a Spanner Wrench
R.S.A.	8	Shaping Horizontal Surfaces
Job	8	Make a Parallel Bar
R.S.A.	9	Angular Shaping
Job	9	Make a Drill Drift
R.S.A.	10	Vertical Shaping
Job	10	Make an Angle Plate
R.S.A.	11	Contour Shaping
Job	11	Make a Cam
R.S.A.	12	Shaping a Tongue and Groove
Job	12	Tongue and Groove Blocks
R.S.A.	13	Block Squaring
Job	13	"V" Blocks
R.S.A.	14	Machining Dovetails
Job	14	Dovetail Block and Slide
R.S.A.	15	Hydraulic Shapers
Job	15	T-Slot Block
R.S.A.	16	Indexing--Simple and Direct
Job	16	Make a Spline
Job	16A	Make a Spline Hub
R.S.A.	17	Gear Tooth Parts
Job	17	Make a Rack Gear
Job	17A	Make a Gear Rack (Alternate)
R.S.A.	18	Making a Gear Segment
Job	18	Make a Gear Segment
Job	18A	Make a Gear Segment (Alternate)
R.S.A.	19	Making a Drill Press Vise
Job	19	Make a Drill Press Vise
R.S.A.	20	Cutting Serrations
Job	20	Make Two Jaws For Drill Press Vise

Unit IV - Lathe

R.S.A.	1	Cutting Tools
Job	1	Grind Lathe Tool Bits
R.S.A.	2	Types of Lathes and Identification of Parts
Job	2	Make 2 Stud Blanks
R.S.A.	3	Principle of the Lathe - Care and Use of the Lathe
Job	3	Make 2 Bushing Drive Bars
R.S.A.	4	Drilling
Job	4	Caliper Parts and Six Washers
R.S.A.	5	Description of the Compound Rest
Job	5	Make a Chucking Center
R.S.A.	6	Filing and Polishing
Job	6	Make a Pump Shaft
R.S.A.	7	Drilling and Reaming
Job	7	Make a Brass Bushing and Steel Roller
R.S.A.	8	Knurling
Job	8	Knurled Shaft

Unit IV - Lathe (Continued)

R.S.A.	9	Turning Tapers - Tailstock Offset Method
Job	9	Make an Arbor
R.S.A.	10	Turning Angles With the Compound Rest
Job	10	Make a Wheel
R.S.A.	11	Cutting V-Threads
Job	11	Thread Two Studs
R.S.A.	12	Screw Threads
Job	12	Thread 2 Shafts
R.S.A.	13	Taper Turning - Taper Attachment - Compound Rest Methods
Job	13	Hoist Traverse Truck Roller Shaft
R.S.A.	14	Tapping
Job	14	Make Shift Rod Spool
R.S.A.	15	Boring
Job	15	Make Drive Shaft Bushing Housing
R.S.A.	16	Interchangeable Manufacture - Mass Production - Fits and Tolerances
Job	16	Make a Drive Shaft Bushing
R.S.A.	17	Taper Boring
Job	17	Make Hoist Traverse Truck Roller and Thrust Washer
R.S.A.	18	Internal Threading
Job	18	Pipe Puller and Nut
R.S.A.	19	Cutting a Left Hand Thread
Job	19	Pipe Puller Screw and Nut
R.S.A.	20	Counterboring--Threading to a Shoulder
Job	20	Make Piston Rod Connecting Spool
R.S.A.	21	Acme Screw Thread
Job	21	External and Internal Acme Thread
R.S.A.	22	Square Threads
Job	22	Cutting a Square Thread
R.S.A.	23	Acme Threading, Single and Multiple
Job	23	Double Lead Acme Thread Left-Hand
R.S.A.	24	Dial Indicator Method
Job	24	Live Center
R.S.A.	25	Pipe Threads
Job	25	Cut and Fit External and Internal Pipe Threads
R.S.A.	26	Social Security Act
Job	26	Tap Handle
R.S.A.	27	Radius Tools
Job	27	Machinist Hammer Kit
Job	28	Milling Machine Jack
R.S.A.	29	Sheaves
Job	29	Emery-Wheel Stand
R.S.A.	30	Faceplate Work, Angle-Plate
Job	30	Machine Cast Elbow
R.S.A.	31	Steady Rest and Follow Rest
Job	31	Turn a Long Shaft
R.S.A.	32	Turning a Crankshaft or an Eccentric

Unit IV - Lathe (Continued)

Job	32	Turn an Eccentric
Job	33	Box and Pin
Job	34	Tap Wrench
Job	35	Marine Propeller Shaft

Unit V - Milling Machine

R.S.A.	1	The Milling Machine
Job	1	To Oil the Milling Machine
R.S.A.	2	Operation of the Milling Machine
Job	2	Machine a Steel Block
R.S.A.	3	Milling Cutters
Job	3	Make 2 Mild Steel Brackets
R.S.A.	4	Mounting the Milling Cutter
Job	4	Machine a Cast Iron Bracket
R.S.A.	5	Work Holding Devices
Job	5	Machine a Spacer
R.S.A.	6	Speeds and Feeds
Job	6	Cut Keyways on a Shaft
R.S.A.	7	Slotting and Sawing
Job	7	Adjustable Parallel Bar
R.S.A.	8	End Mills and Woodruff Keyseat Cutters
Job	8	Keyslot Cut With End Mill
R.S.A.	9	Coolants and Their Uses
Job	9	Cut a Woodruff Keyseat
R.S.A.	10	Straddle Milling
Job	10	Make a Nut
R.S.A.	11	Climb Milling
Job	11	Make and Graduate a Keyseat Rule
R.S.A.	12	Special Attachments
Job	12	Gear Case Cover
R.S.A.	13	Fixtures
Job	13	Fixture For Slotting Screws
R.S.A.	14	The Index Head
Job	14	Steel Index Pin
R.S.A.	15	Using the Index Head
Job	15	Graduate a Machine Tool Feed Dial--125 Divisions
R.S.A.	16	Spur Gearing
Job	16	Machine a Pair of Spur Gears
R.S.A.	17	Spline Cutting and Fly Cutters
Job	17	Cut a Spline Shaft (A. Using 2 Cutters) (B. Using Fly Cutters)
R.S.A.	18	Clutches and Couplings
Job	18	Machine a Straight-Toothed Clutch
Job	19	Machine Saw-Toothed Clutch
R.S.A.	20	Bevel Gears
Job	20	Bevel Gears Right Angle Shafts
R.S.A.	21	Cam Milling
Job	21	Mill a Cam



Unit V - Milling Machine

R.S.A.	22	Helical or Spiral Milling
Job	22	Steel Pull Pin
R.S.A.	23	Spiral Milling
Job	23	Spiral Milling Cutter
R.S.A.	24	Spiral Gear
Job	24	Spiral Gear
Supplementary Jobs		
Sup. Job	25	Make a Tap
Sup. Job	26	Machine a Reamer
Sup. Job	27	Make a Worm and Worm Gear
Sup. Job	28	Make a Step Block

OFFICE OCCUPATIONS  
ACCOUNTING  
Trade Preparatory

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The Accounting Course was written in 1955, revised in 1958 and again in 1963. It is available in book form. This material consists of 60 jobs.

The reference for this Course is listed below:

Title	Source
Sherwood, Boling, Carson, COLLEGE ACCOUNTING 7th Edition, 1962	South-Western Publishing Co., 5101 Madison Road Cincinnati 27, Ohio

A detailed outline of the Accounting Course follows:

Unit One, ELEMENTS OF ACCOUNTING  
Report One, ASSETS, LIABILITIES, AND PROPRIETORSHIP

Job No. 1 - Perform Practical Problems Involving Accounting  
Equation

Unit One, ELEMENTS OF ACCOUNTING  
Report Two, THE DOUBLE ENTRY PROCESS

Job No. 2 - Record Transactions in "T" Accounts; Take Balance  
of Accounts; Prepare Trial Balance.

Unit Two, ACCOUNTING PROCEDURE  
Report Three, JOURNALIZING TRANSACTIONS

Job No. 3 - Analyze Transactions; Make General Journal Entries

Unit Two, ACCOUNTING PROCEDURE  
Report Four, POSTING AND THE TRIAL BALANCE

Job No. 4 - Make Journal Entries; Post Entries; Take Trial  
Balance.

Unit Two, ACCOUNTING PROCEDURE  
Report Five, THE FINANCIAL STATEMENTS

Job No. 5 - Prepare Income Statement; Prepare Balance Sheet.

Unit Three, ACCOUNTING FOR MERCHANDISE  
Report Six, PURCHASES AND THE PURCHASES JOURNAL

Job No. 6 - Make Journal Entries of Transactions Stressing  
Purchases Journal; Posting to Ledger and Taking  
Trial Balance

Course Outline (Continued)

Unit Three, ACCOUNTING FOR MERCHANDISE  
Report Seven, SALES AND THE SALES JOURNAL

Job No. 7 - Make Journal Entries of Transactions Stressing  
Sales Journal; Posting to Ledger and Taking Trial  
Balance

Unit Three, ACCOUNTING FOR MERCHANDISE  
Report Eight, ACCOUNTING PROCEDURE

Job No. 8 - Make Journal Entries Using the General Journal,  
Purchases Journal, and Sales Journal, Posting to  
Ledger and Taking Trial Balance.

Unit Four, ACCOUNTING FOR CASH  
Report Nine, RECORD OF CASH RECEIPTS AND DISBURSEMENTS: PETTY  
CASH

Job No. 9 - Record Transactions in the Cashbook, the Combined  
Cash-Journal, Petty Cash Disbursements Record, and  
Other Special Journals: Prove, Post, and Take a  
Trial Balance.

Unit Four, ACCOUNTING FOR CASH  
Report Ten, BANKING PROCEDURE

Job No. 10 - Perform Operations in Transactions Affecting Banking;  
Reconcile Bank Balance; Record Transactions in the  
Combined Cash-Journal and Other Special Journals:  
Post and Take a Trial Balance.

Unit Five, PAYROLL ACCOUNTING  
Report Eleven, EARNINGS AND DEDUCTIONS

Job No. 11 - Complete Payroll Records; Compute Employee Wages and  
Deductions.

Unit Five, PAYROLL ACCOUNTING  
Report Twelve, PAYROLL TAXES IMPOSED ON THE EMPLOYER

Job No. 12 - Journalize Transactions Concerning the Accounting  
for Payrolls and Payroll Deductions; Post and  
Enter Account Balances.

Unit Six, ACCOUNTING FOR A RETAIL STORE  
Report Thirteen, PRINCIPLES AND PROCEDURES

Job No. 13 - Classify Accounts and Analyze Procedures Relating to  
Retail Accounting; Journalize Transactions.

Course Outline (Continued)

Unit Six, ACCOUNTING FOR A RETAIL STORE  
Report Fourteen, APPLICATION OF ACCOUNTING PRINCIPLES

Job No. 14 - Answering Questions Taken From the Books of a  
Retail Merchant

Unit Seven, THE PERIODIC SUMMARY  
Report Fifteen, END-OF-PERIOD WORK SHEET

Job No. 15 - Complete a Work Sheet for a Mercantile Enterprise

Unit Seven, THE PERIODIC SUMMARY  
Report Sixteen, THE FINANCIAL STATEMENTS

Job No. 16 - Check Work Sheet Procedures; Prepare an Income  
Statement and Balance Sheet; Compute Ratios

Unit Eight, ADJUSTING AND CLOSING ACCOUNTS AT END OF ACCOUNTING  
PERIOD  
Report Seventeen, ADJUSTING ENTRIES

Job No. 17 - Made Adjusting Entries in Journal Form; Post and  
Prepare Cost of Goods Sold Schedule

Unit Eight, ADJUSTING AND CLOSING ACCOUNTS AT END OF ACCOUNTING  
PERIOD  
Report Eighteen, CLOSING PROCEDURE

Job No. 18 - Draft Entries to Close Temporary Proprietorship  
Accounts; Post and Rule Accounts in Balance; Take  
Post-Closing Trial Balance; Draft Reversing Entries  
and Post

Unit Nine, ACCOUNTING FOR INVESTMENTS  
Report Nineteen, ACCOUNTING PROCEDURE

Job No. 19 - Journalize Transactions Dealing with Investments;  
Post Entries; Close Temporary Accounts

Unit Ten, THE PERSONAL SERVICE ENTERPRISE  
Report Twenty, ACCOUNTING METHODS

Job No. 20 - Journalizing Transactions Dealing with Personal  
Service Enterprises; Complete Work Sheet; Draft  
Adjusting and Closing Entries; Prepare Financial  
Statements

OFFICE OCCUPATIONS  
ACCOUNTING  
Trade Preparatory

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Course Outline (Continued)

Unit Eleven, ACCOUNTING FOR OWNERS' EQUITY  
Report Twenty-One, THE SOLE PROPRIETORSHIP

Job No. 21 - Make Opening Entries, and Record Necessary Changes  
at End of Accounting Period

Unit Eleven, ACCOUNTING FOR OWNERS' EQUITY  
Report Twenty-Three, THE CORPORATION

Job No. 23 - Answer Questions and Record Transactions Regarding  
Corporations

Unit Twelve, ACCOUNTING FOR NOTES AND DRAFTS  
Report Twenty-Four, NOTES

Job No. 24 - Draft Entries Concerning Notes; Record Entries in  
Notes Receivable and Notes Payable Registers

Unit Twelve, ACCOUNTING FOR NOTES AND DRAFTS  
Report Twenty-Five, DRAFTS AND TRADE ACCEPTANCES

Job No. 25 - Draft Entries Regarding Drafts and Trade Acceptances;  
Complete Partial Posting

Unit Thirteen, ACCOUNTING FOR PURCHASES  
Report Twenty-Six, PURCHASING PROCEDURE

Job No. 26 - Complete Statements and Fill in Forms That are Used  
in the Purchasing Procedure

Unit Thirteen, ACCOUNTING FOR PURCHASES  
Report Twenty-Seven, ACCOUNTING PRACTICE

Job No. 27 - Verify Invoices; Enter Invoices in Invoice Record;  
Complete Individual and Summary Posting; Prepare  
Schedule of Accounts Payable.

Unit Fourteen, ACCOUNTING FOR SALES  
Report Twenty-Eight, CASH SALES AND CREDIT SALES

Job No. 28 - Complete Statements; Prepare Sales Invoices; Enter  
Sales in Sales Record; Complete Individual and  
Summary Posting; Prepare Schedule of Accounts  
Receivable

Course Outline (Continued)

Unit Fifteen, INSTALLMENT SALES AND CONSIGNMENT SALES  
Report Twenty-Nine, INSTALLMENT SALES

Job No. 29 - Answer Questions and Work Problems Concerning  
Installment Sales

Unit Fifteen, INSTALLMENT SALES AND CONSIGNMENT SALES  
Report Thirty, CONSIGNMENT SALES

Job No. 30 - Answer Questions and Draft Entries Concerning  
Consignment Sales

Unit Sixteen, ACCOUNTING FOR INVENTORY AND PREPAID EXPENSES  
Report Thirty-One, MERCHANDISE INVENTORY

Job No. 31 - Analyze Merchandise Accounting Procedures; Complete  
Inventory Extensions; Prepare Revised Income  
Statement

Unit Sixteen, ACCOUNTING FOR INVENTORY AND PREPAID EXPENSES  
Report Thirty-Two, PREPAID EXPENSES

Job No. 32 - Analyze Transactions and Work Problems Concerning  
Prepaid Expenses

Unit Seventeen, ACCOUNTING FOR TANGIBLE FIXED ASSETS  
Report Thirty-Three, LAND, BUILDINGS, AND EQUIPMENT

Job No. 33 - Answer Questions and Work Problems Concerning  
Depreciation of Fixed Assets

Unit Seventeen, ACCOUNTING FOR TANGIBLE FIXED ASSETS  
Report Thirty-Four, ACCOUNTING PROCEDURE

Job No. 34 - Record the Purchasing, Depreciation, and Disposition  
of Fixed Assets

Unit Eighteen, ACCOUNTING FOR A WHOLESALE BUSINESS  
Report Thirty-Five, APPLICATION OF ACCOUNTING PRINCIPLES

Job No. 35 - Complete Analysis Test Based on Books of Account  
in Reference

Unit Nineteen, ACCOUNTING PROCEDURE AT END OF MONTH  
Report Thirty-Six, MONTHLY ADJUSTMENT OF THE OPERATING EXPENSE  
ACCOUNTS

Job No. 36 - Draft Adjusting Entries; Complete Posting Procedures;  
Prepare Schedule of Operating Expenses



OFFICE OCCUPATIONS  
ACCOUNTING  
Trade Preparatory

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Course Outline (Continued)

Unit Nineteen, ACCOUNTING PROCEDURE AT END OF MONTH  
Report Thirty-Seven, END-OF-PERIOD WORK SHEET

Job No. 37 - Prepare Work Sheets

Unit Twenty, MONTHLY FINANCIAL STATEMENTS AND PROCEDURE AT END  
OF YEAR  
Report Thirty-Eight, THE INCOME STATEMENT

Job No. 38 - Prepare Income Statement, Schedule of Cost of  
Goods Sold, and Percentage Analysis

Unit Twenty, MONTHLY FINANCIAL STATEMENTS AND PROCEDURE AT END  
OF YEAR  
Report Thirty-Nine, THE BALANCE SHEET

Job No. 39 - Prepare Balance Sheet; Compute Ratio Analysis

Unit Twenty, MONTHLY FINANCIAL STATEMENTS AND PROCEDURE AT END  
OF YEAR  
Report Forty, PROCEDURE AT END OF YEAR

Job No. 40 - Prepare Work Sheet, Income Statement, Balance  
Sheet, and Schedule of Cost of Goods Sold; Draft  
and Post Adjusting and Closing Entries; Rule  
Accounts and Take Post-Closing Trial Balance

Unit Twenty-One, THE CORPORATE ORGANIZATION  
Report Forty-One, ORGANIZATION AND MANAGEMENT

Job No. 41 - Analyze Statements and Answer Questions Concerning  
the Corporate Organization and the Certificate of  
Incorporation

Unit Twenty-One, THE CORPORATE ORGANIZATION  
Report Forty-Two, CORPORATE RECORDS

Job No. 42 - Answer Questions and Make Entries in Stock Records

Unit Twenty-Two, ACCOUNTING FOR CAPITAL STOCK  
Report Forty-Three, TYPES AND VALUES OF CAPITAL STOCK

Job No. 43 - Analyze Statements and Work Problems Concerning  
Capital Stock

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ACCOUNTING  
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Course Outline (Continued)

Unit Twenty-Two, ACCOUNTING FOR CAPITAL STOCK  
Report Forty-Four, RECORDING CAPITAL STOCK TRANSACTIONS

Job No. 44 - Analyze Corporate Accounts and Stock Transactions;  
Record Capital Stock Transactions in Journal Form;  
Post; Take Trial Balance.

Unit Twenty-Three, ACCOUNTING FOR CORPORATION EARNINGS  
Report Forty-Five, EARNINGS RETAINED IN THE BUSINESS

Job No. 45 - Analyze Statements and Journalize Transactions  
Concerning Corporation Earnings; Prepare Statement  
of Retained Earnings.

Unit Twenty-Three, ACCOUNTING FOR CORPORATION EARNINGS  
Report Forty-Six, EARNINGS DISTRIBUTED TO STOCKHOLDERS

Job No. 46 - Analyze Statements and Record Transactions in  
Journal Form Concerning the Distribution of  
Corporate Earnings

Unit Twenty-Four, ACCOUNTING FOR CORPORATION BONDS  
Report Forty-Seven, ACCOUNTING FOR BONDS SOLD

Job No. 47 - Answer Questions and Journalize Transactions  
Concerning Bond Sales and Bond Interest

Unit Twenty-Four, ACCOUNTING FOR CORPORATION BONDS  
Report Forty-Eight, ACCOUNTING FOR BOND INTEREST EXPENSE AND  
FOR BONDS RETIRED

Job No. 48 - Answer Questions and Draft Entries Concerning Bond  
Interest, Amortization, and Sinking Fund

Unit Twenty-Five, ACCOUNTING FOR INTANGIBLE AND WASTING ASSETS  
Report Forty-Nine, ACCOUNTING PROCEDURE

Job No. 49 - Answer Questions and Draft Adjusting Entries Con-  
cerning Intangible and Wasting Assets; Prepare  
Schedule of Intangible Assets

Unit Twenty-Six, THE VOUCHER SYSTEM OF ACCOUNTING  
Report Fifty, PRINCIPLES OF VOUCHER ACCOUNTING

Job No. 50 - Prepare Vouchers; Record Voucher Register; Record  
Payment of Vouchers

OFFICE OCCUPATIONS  
ACCOUNTING  
Trade Preparatory

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Course Outline (Continued)

Unit Twenty-Seven, ACCOUNTING FOR A MANUFACTURING BUSINESS  
Report Fifty-One, MANUFACTURING COST; INVENTORIES OF A  
MANUFACTURING BUSINESS

Job No. 51 - Answer Questions and Work Problems Concerning  
Manufacturing Cost

Unit Twenty-Seven, ACCOUNTING FOR A MANUFACTURING BUSINESS  
Report Fifty-Two, THE CHART OF ACCOUNTS AND RECORDS OF A  
MANUFACTURING BUSINESS

Job No. 52 - Answer Questions and Number Accounts Based on  
Chart of Accounts in Reference

Unit Twenty-Eight, ACCOUNTING FOR A MANUFACTURING BUSINESS  
(CONCLUDED)  
Report Fifty-Three, THE WORK SHEET OF A MANUFACTURING BUSINESS

Job No. 53 - Prepare a Work Sheet for a Manufacturing Enterprise

Unit Twenty-Eight, ACCOUNTING FOR A MANUFACTURING BUSINESS  
(CONCLUDED)  
Report Fifty-Four, THE ANNUAL REPORT OF A MANUFACTURING BUSINESS

Job No. 54 - Prepare and Analyze Financial Statements

Unit Twenty-Eight, ACCOUNTING FOR A MANUFACTURING BUSINESS  
(CONCLUDED)  
Report Fifty-Five, CLOSING THE BOOKS OF A MANUFACTURING BUSINESS

Job No. 55 - Draft and Post Adjusting, Closing, and Reversing  
Entries; Take Post-Closing Trial Balance

Unit Twenty-Nine, ACCOUNTING FOR BRANCH OPERATION  
Report Fifty-Six, RECIPROCAL ACCOUNTS AND RECORDING PROCEDURE

Job No. 56 - Analyze Transactions; Journalize Transactions, Post,  
and Take Trial Balance for the Home Office and the  
Branch

Unit Twenty-Nine, ACCOUNTING FOR BRANCH OPERATIONS  
Report Fifty-Seven, PROCEDURE AT CLOSE OF FISCAL YEAR

Job No. 57 - Analyze Statements; Complete the Work at the End  
of the Accounting Period for Both the Home Office  
and the Branch

OFFICE OCCUPATIONS  
ACCOUNTING  
Trade Preparatory

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Course Outline (Continued)

Unit Twenty-Nine, ACCOUNTING FOR BRANCH OPERATIONS  
Report Fifty-Eight, COMBINED FINANCIAL STATEMENTS OF HOME OFFICE  
AND BRANCH

Job No. 58 - Prepare Combined Income Statement and Balance  
Sheet; Complete Analysis Test

Unit Thirty, ANALYSIS OF FINANCIAL STATEMENTS  
Report Fifty-Nine, COMPARATIVE ANALYSIS: RATIOS

Job No. 59 - Comparative Analysis of the Financial Statements;  
Compute Ratios

Unit Thirty, ANALYSIS OF FINANCIAL STATEMENTS  
Report Sixty, THE STATEMENT OF SOURCE AND APPLICATION OF FUNDS

Job No. 60 - Complete Work Sheet; Prepare a Statement of Source  
and Application of Funds, A Schedule of Current  
Assets and Current Liabilities

OFFICE OCCUPATIONS  
BUSINESS ENGLISH  
Trade Preparatory

C Page 1 of 2

The Business English Course was written in 1961 and revised in 1964. It is available in bound form and consists of 34 jobs.

The reference for the Business English Course is listed below:

Title	Source
Aurner, Robert R. PRACTICAL BUSINESS ENGLISH FOR COLLEGES, Third Edition, 1960	South-Western Publishing Co. 221 Pacific Avenue Dallas 2, Texas

A detailed outline of the Business English Course follows:

- Job No. 1: Parts of Speech
- Job No. 2: Participles
- Job No. 3: Infinitives
- Job No. 4: Case of Nouns and Pronouns
- Job No. 5: Relative and Interrogative Pronouns
- Job No. 6: Forming Plurals of Nouns and Pronouns
- Job No. 7: Forming the Singular Possessive and the Plural Possessive of Nouns and Pronouns
- Job No. 8: Agreement of the Pronoun and Its Antecedent
- Job No. 9: Agreement of the Pronoun and Its Antecedent (Cont'd)
- Job No. 10: Verb Tenses
- Job No. 11: Treacherous Verbs
- Job No. 12: Agreement of Verb with Subject
- Job No. 13: Agreement of Verb with Collective and Compound Subjects
- Job No. 14: Contractions
- Job No. 15: Adjectives
- Job No. 16: Adverbs

Course Outline (Continued)

- Job No. 17: Distinguishing Adverbs from Adjectives
- Job No. 18: Prepositions
- Job No. 19: Conjunctions
- Job No. 20: Parallel Structure
- Job No. 21: The Sentence
- Job No. 22: Simple, Compound, and Complex Sentences
- Job No. 23: Misused Words and Phrases
- Job No. 24: The Period
- Job No. 25: The Comma
- Job No. 26: The Comma (Cont'd)
- Job No. 27: The Semicolon
- Job No. 28: The Semicolon (Cont'd)
- Job No. 29: Capitalization
- Job No. 30: Capitalization (Cont'd)
- Job No. 31: Order of and Spacing after Punctuation Marks
- Job No. 32: Expression of Numbers
- Job No. 33: Expression of Numbers (Cont'd)
- Job No. 34: Abbreviations



OFFICE OCCUPATIONS  
BUSINESS LAW  
Trade Preparatory

C Page 1 of 5

The Business Law Course was written in 1955 and revised in 1961. It is available in bound form. This material consists of 54 jobs.

The references for the Business Law Course are listed below:

Title	Source
Fisk and Snapp APPLIED BUSINESS LAW 8th Edition, 1960	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio
LEGAL SECRETARY HANDBOOK (Louisiana)	Shreveport Legal Secretaries Association Shreveport, Louisiana

A detailed outline of the Business Law Course follows:

Job 1

Law and Legal Problems

Job 2

Law and Legal Problems

Job 3

Law and Legal Problems

Job 4

Contracts

Job 5

Contracts

Job 6

Contracts

Job 7

Contracts

Job 8

Review and Test

Course Outline (Continued)

Job 9

Contracts

Job 10

Contracts

Job 11

Contracts

Job 12

Contracts

Job 13

Contracts

Job 14

Contracts

Job 15

Review and Test

Job 16

Bailments

Job 17

Bailments

Job 18

Bailments

Job 19

Buyer and Seller

Job 20

Buyer and Seller

Course Outline (Continued)

Job 21

Buyer and Seller

Job 22

Contracts

Job 23

Buyer and Seller

Job 24

Buyer and Seller

Job 25

Review and Test

Job 26

Debtors and Creditors

Job 27

Debtors and Creditors

Job 28

Negotiable Instruments

Job 29

Negotiable Instruments

Job 30

Negotiable Instruments

Job 31

Negotiable Instruments

Job 32

Negotiable Instruments

Course Outline (Continued)

Job 33

Negotiable Instruments

Job 34

Review and Test

Job 35

Employer and Employee

Job 36

Employer and Employee

Job 37

Employer and Employee

Job 38

Employer and Employee

Job 39

Principal and Agent

Job 40

Principal and Agent

Job 41

Review and Test

Job 42

Insurance

Job 43

Insurance

Job 44

Insurance

Course Outline (Continued)

Job 45

Motor Vehicles

Job 46

Motor Vehicles

Job 47

Review and Test

Job 48

Property

Job 49

Property

Job 50

Property

Job 51

Property

Job 52

Business Organization

Job 53

Business Organization

Job 54

Review and Test

OFFICE OCCUPATIONS  
BUSINESS LETTER WRITING  
Trade Preparatory

C Page 1 of 2

The Business Letter Writing Course was written in 1962 and revised in 1967. A Student Handbook and an Instructor's Guide are available in book form.

The references for the Business Letter Writing Course are the following:

Title	Source
Aurner, Robert R. EFFECTIVE COMMUNICATION IN BUSINESS, Fourth Edition	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio
Gavin and Hutchinson REFERENCE MANUAL FOR STENOGRAPHERS AND TYPISTS Third Edition	Gregg Division McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Gove, Philip B. (Editor-in-Chief) WEBSTER'S SEVENTH NEW COLLEGIATE DICTIONARY, Seventh Edition	G & C Merriam Company Springfield, Massachusetts
Larson, Lena and A. Koebele REFERENCE MANUAL FOR OFFICE EMPLOYEES, Fourth Edition	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio
Payne, Lucile Vaughan THE LIVELY ART OF WRITING	Follett Publishing Company 1010 West Washington Blvd. Chicago 7, Illinois
Robertson, Mary and Charles F. Walker PRACTICAL BUSINESS CORRESPONDENCE FOR COLLEGES Third Edition	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio
Wilkinson, Menning and Anderson WRITING FOR BUSINESS, Third Edition	Richard D. Irwin, Inc. Homewood, Illinois

A detailed outline of the Business Letter Writing Course follows:

- UNIT 1 - Capturing Attention Through Business Letter Styling
- UNIT 2 - Five Tests of an Effective Letter



OFFICE OCCUPATIONS  
BUSINESS LETTER WRITING  
Trade Preparatory

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Course Outline (Continued)

- UNIT 3 - Human Relations in Effective Letters
- UNIT 4 - Letters that Ask, Reply, Order, Acknowledge or Remit
- UNIT 5 - Letters that Invite, Announce, or Express Appreciation  
or Sympathy
- UNIT 6 - Letters that Introduce, Inquire About, or Recommend  
Individuals
- UNIT 7 - Letters that Secure Employment
- UNIT 8 - Letters that Sell
- UNIT 9 - Letters that Present Claims and Handle Adjustments
- UNIT 10 - Letters that Involve Credit and Collections
- UNIT 11 - Letters that Build Reports
- UNIT 12 - Special Forms of Communication
- UNIT 13 - Dictating Business Letters
- UNIT 14 - Letter-Writing Projects

OFFICE OCCUPATIONS  
BUSINESS MATHEMATICS  
Trade Preparatory

C Page 1 of 2

The Business Mathematics Course was revised in 1961. It is available in bound form. This material consists of 32 jobs.

The reference for the Business Mathematics Course is listed below:

Title	Source
Rice, Boyd, and Mayne, BUSINESS MATHEMATICS FOR COLLEGES, Fourth Edition, 1961	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio

A detailed outline of the Business Mathematics Course follows:

- Job 1 - Inventory Test
- Job 2 - Addition and Subtraction
- Job 3 - Check Records
- Job 4 - Multiplication Inventory
- Job 5 - Division: Averages and Turnover
- Job 6 - Weights and Measures
- Job 7 - Addition and Subtraction of Decimals
- Job 8 - Multiplication and Division of Decimals
- Job 9 - Addition and Subtraction of Fractions
- Job 10 - Multiplication and Division of Fractions
- Job 11 - Aliquot Parts, Sales Tickets and Invoices, and Repair Orders
- Job 12 - Percentage, Base, and Rate
- Job 13 - Cash and Trade Discounts
- Job 14 - Commissions, Sales, and Purchases
- Job 15 - Statement of Profit and Loss: Mark-up
- Job 16 - Depreciation and Overhead

OFFICE OCCUPATIONS  
BUSINESS MATHEMATICS  
Trade Preparatory

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Course Outline (Cont'd)

- Job 17 - Simple Interest
- Job 18 - Promissory Notes and Interest
- Job 19 - Interest Tables: Other Interest Formulas
- Job 20 - Bank Discount
- Job 21 - Interest on Unpaid Balances
- Job 22 - Compound Interest and Present Value
- Job 23 - Annuities, Sinking Funds, and Amortization
- Job 24 - Fire, Casualty, and Life Insurance
- Job 25 - Payroll Sheet, Change Tally, and Change Slip
- Job 26 - Payroll Deductions
- Job 27 - Sales and Property Taxes
- Job 28 - Federal Income Tax
- Job 29 - Income Statement Analysis
- Job 30 - Balance Sheet Analysis
- Job 31 - Statistics and Graphs
- Job 32 - Stocks and Bonds and Policies

OFFICE OCCUPATIONS  
BUSINESS STRUCTURE, ORGANIZATION  
AND MANAGEMENT  
Trade Preparatory

C Page 1 of 2

The Business Structure, Organization and Management Course was written in 1955 and revised in 1963. It is available in bound form. This material consists of 32 jobs.

The reference for the Business Structure, Organization and Management Course is listed below:

Title	Source
Raymond E. Glos and Harold A. Baker INTRODUCTION TO BUSINESS 5th Edition (4th Ed. available)	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio

A detailed outline of the Business Structure, Organization and Management Course follows:

Unit 1 - Business--Its Nature, Environment, and Opportunities

- Job 1 The Nature of American Business
- Job 2 Business and Its Environment
- Job 3 Careers in Business

Unit 2 - Ownership, Management, and Organization

- Job 4 Sole Proprietorships and Partnerships
- Job 5 Corporations
- Job 6 Management and Organization

Unit 3 - Marketing

- Job 7 The Nature and Scope of Marketing
- Job 8 Retailing and Retailers
- Job 9 Wholesaling and Wholesalers
- Job 10 Prices and Pricing
- Job 11 Advertising Problems
- Job 12 International Trade

Unit 4 - Physical Factors

- Job 13 Location and Layout
- Job 14 Purchasing and Inventory Control
- Job 15 Production Problems

Unit 5 - Personnel

- Job 16 Employee Selection and Training
- Job 17 Employee Compensation
- Job 18 Labor Problems and Legislation

OFFICE OCCUPATIONS  
BUSINESS STRUCTURE, ORGANIZATION  
AND MANAGEMENT  
Trade Preparatory

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Course Outline (Continued)

Unit 6 - Finance

- Job 19 Long-Term Finance
- Job 20 Short-Term Finance
- Job 21 Financial Institutions
- Job 22 Security Exchanges and Financial News
- Job 23 Risks and Insurance
- Job 24 Financial Problems and Policies

Unit 7 - Quantitative Controls for Decision Making

- Job 25 Accounting and Financial Statements
- Job 26 Business Statistics
- Job 27 Budgets and Forecasting

Unit 8 - Legal and Regulatory Environment of Business

- Job 28 Ethics and Business Law
- Job 29 Regulation of Competitive Business
- Job 30 Regulated Industries
- Job 31 Taxation and Business

OFFICE OCCUPATIONS  
FILING  
Trade Preparatory

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The Filing Course was revised in 1961 and again in 1963. It is available in bound form. This material consists of 23 Jobs.

The reference for the Filing Course is listed below:

Title	Source
Kahn, Yerian and Stewart PROGRESSIVE FILING 1961	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York

A detailed outline of the Filing Course follows:

- Job 1 Indexing Rules, Alphabetic Card Filing
- Job 2 Indexing Rules, Alphabetic Card Filing
- Job 3 Indexing Rules, Alpnabetic Card Filing
- Job 4 Indexing Rules, Alphabetic Card Filing
- Job 5 Indexing Rules, Alphabetic Card Filing
- Job 6 Indexing Rules, Alphabetic Card Filing
- Job 7 Filing Procedures and Materials
- Job 8 Alphabetic Correspondence Filing
- Job 9 Alphabetic Correspondence Filing
- Job 10 Charge Methods, Transfer Methods
- Job 11 Selection of Equipment and Supplies
- Job 12 Numeric Correspondence Filing
- Job 13 Numeric Correspondence Filing
- Job 14 Geographic Correspondence Filing
- Job 15 Geographic Correspondence Filing
- Job 16 Subject Correspondence Filing
- Job 17 Subject Correspondence Filing
- Job 18 Card Filing--Vertical and Visible; Decimal--  
Subject Co-response Filing



OFFICE OCCUPATIONS  
FILING  
Trade Preparatory

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Course Outline (Cont'd)

- Job 19 Decimal--Subject Correspondence Filing
- Job 20 Soundex Coding System, Triple-Check Automatic Index
- Job 21 Cards and Visible Records
- Job 22 Establishing and Maintaining Filing Systems
- Job 13 Final Test

OFFICE OCCUPATIONS  
FULL-KEYBOARD ADDING-LISTING MACHINE  
Trade Preparatory

C Page 1 of 2

The Full-Keyboard Adding Listing Machine Course was written in 1955 and revised in 1963. It is available in bound form. The material covers 20 jobs.

The reference for the Full-Keyboard Adding-Listing Machine Course is listed below.

Title	Source
Agnew and Pasewark FULL-KEYBOARD ADDING-LISTING MACHINE COURSE, Third Edition	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio

A detailed outline of the Full-Keyboard Adding-Listing Machine Course follows:

- Job 1 ADDITION - Zeros; One- and Two-Digit Numbers
- Job 2 ADDITION - Three-Digit Numbers
- Job 3 ADDITION - Four-, Five-, and Six-Digit Numbers;  
Non-Add Key
- Job 4 SUBTRACTION AND CORRECTION OF ERRORS
- Job 5 SPEED DRILL-ADDITION
- Job 6 REPEAT ADDITION
- Job 7 MULTIPLICATION
- Job 8 SUBTOTAL AND CROSSFOOTING
- Job 9 SPEED DRILL - ADDITION
- Job 10 TEST NO. 1
- Job 11 PERCENTAGES, DECIMALS, AND FRACTIONS
- Job 12 FIXED DECIMAL POINT
- Job 13 MULTIPLICATION, Short Cut Method
- Job 14 DISCOUNT AND NET AMOUNT
- Job 15 SPEED DRILL - ADDITION
- Job 16 DIVISION - Decimals in Dividend and Divisor
- Job 17 CREDIT BALANCES

OFFICE OCCUPATIONS  
FULL-KEYBOARD ADDING-LISTING MACHINE  
Trade Preparatory

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Course Outline (Continued)

- Job 18 BUSINESS FORMS
- Job 19 SPEED DRILL - ADDITION
- Job 20 TEST NO. 2

OFFICE OCCUPATIONS  
KEY-DRIVEN CALCULATOR  
Trade Preparatory

C Page 1 of 4

The Key-Driven Calculator material was written in 1955 and revised in 1963. It is available in bound form. This material consists of 60 jobs.

The reference for the Key-Driven Calculator Course is listed below:

Title	Source
Agnew and Pasewark KEY-DRIVEN CALCULATOR COURSE 4th Edition	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio

A detailed outline of the Key-Driven Calculator Course follows:

Part 1

- Job 1 - TOUCH ADDITION - Two Digit Numbers 1-5; One-Key Ascent and Descent
- Job 2 - TOUCH ADDITION - Two-Key Ascent and Descent; Decimals
- Job 3 - TOUCH ADDITION - Numbers 6-9
- Job 4 - TOUCH ADDITION - Three-Digit Numbers; Zeros
- Job 5 - MULTIPLICATION - One- and Two-Digit Factors; Decimals
- Job 6 - TOUCH ADDITION - Three-Key Ascent and Descent
- Job 7 - SUBTRACTION
- Job 8 - TOUCH ADDITION - Four-Key Ascent and Descent
- Job 9 - DIVISION - Trial-Divisor Method
- Job 10 - TEST NUMBER ONE

Part 2

- Job 11 - MULTIPLICATION - Natural Fingering; Three- and Four-Digit Multiplicands
- Job 12 - MULTIPLICATION - Reverse and Cross Hand Fingering
- Job 13 - SPEED DRILL - Three-Column Addition

OFFICE OCCUPATIONS  
KEY-DRIVEN CALCULATOR  
Trade Preparatory

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Course Outline (Continued)

- Job 14 - TOUCH ADDITION - Four-Digit Numbers
- Job 15 - MULTIPLICATION - Interposed Fingering; Zeros
- Job 16 - SUBTRACTION - Zeros and Nines; Fewer Digits in Subtrahend
- Job 17 - SPEED DRILL - Four-Column Addition
- Job 18 - CROSSFOOTING
- Job 19 - DIVISION - Decimals in Quotient; Decimals in Dividend and Divisor; Nines in Divisor
- Job 20 - TEST NUMBER TWO

Part 3

- Job 21 - MULTIPLICATION - Fractions
- Job 22 - MULTIPLICATION - Accumulation of Products
- Job 23 - SPEED DRILL - Multiplication of Four-Digit Multiplicands
- Job 24 - MULTIPLICATION - Fixed Decimal
- Job 25 - MULTIPLICATION - Left-to-Right, Using a Fixed Decimal
- Job 26 - TOUCH ADDITION - Five-Digit Numbers
- Job 27 - SPEED DRILL - Five-Column Addition
- Job 28 - INVENTORIES - Pricing by C, M, and CWT
- Job 29 - Compound Multiplication
- Job 30 - Test Number Three

Part 4

- Job 31 - MULTIPLICATION - Left-to-Right, Dropping off the Keyboard
- Job 32 - MULTIPLICATION - Splitting the Key Factor
- Job 33 - SPEED DRILL - Four-Column Addition

Course Outline (Continued)

- Job 34 - PERCENTAGE
- Job 35 - PERCENTAGE OF INCREASE AND DECREASE
- Job 36 - TOUCH ADDITION - Six-Digit Numbers
- Job 37 - SPEED DRILL - Five-Column Addition
- Job 38 - DISCOUNTS
- Job 39 - CHAIN DISCOUNTS
- Job 40 - TEST NUMBER FOUR
- Part 5
- Job 41 - INVENTORIES
- Job 42 - INVENTORIES - Turnover and Unit Cost
- Job 43 - SPEED DRILL - Multiplication of Four-Digit Factors  
with Decimals
- Job 44 - SALES DISTRIBUTION AND REPORTS
- Job 45 - LEDGER SHEETS
- Job 46 - TOUCH ADDITION - Seven-Digit Numbers
- Job 47 - SPEED DRILL - Four-Column Addition Handwritten
- Job 48 - CREDIT BALANCES
- Job 49 - DIVISION - Reciprocal Method
- Job 50 - TEST NUMBER FIVE
- Part 6
- Job 51 - PRORATING
- Job 52 - RECONCILIATION OF BANK STATEMENTS
- Job 53 - SPEED DRILL - Four-Column Addition
- Job 54 - PAYROLL



OFFICE OCCUPATIONS  
KEY-DRIVEN CALCULATOR  
Trade Preparatory

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Course Outline (Continued)

Job 55 - PAYROLL SUMMARY

Job 56 - TOUCH ADDITION - Eight-Digit Numbers

Job 57 - SPEED DRILL - Six-, Seven-, and Eight-Column Addition

Job 58 - DEVISING TABLES OF NUMBERS

Job 59 - COMMISSIONS

Job 60 - TEST NUMBER SIX

OFFICE OCCUPATIONS  
OFFICE PRACTICE  
Trade Preparatory

C Page 1 of 3

The Office Practice Course was revised in 1960. It is available in bound form. The material consists of 23 jobs.

The reference for the Office Practice Course is listed below:

Title	Source
Place and Hicks, COLLEGE SECRETARIAL PROCEDURES Second Edition	Gregg Publishing Division McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York

A detailed outline of the Office Practice Course follows:

Job No. 1

Course Introduction  
A Secretary's Role in Business

Job No. 2

Personality and Human Relations

Job No. 3

Dictation and Transcription

Job No. 4

Incoming Mail

Job No. 5

Outgoing Mail Procedures

Job No. 6

Filing and Records Organization

Job No. 7

Filing Systems and Maintenance

Job No. 8

A Secretary's Role in Public Relations

Job No. 9

Telephone Techniques and Services

Course Outline (Continued)

Job No. 10

Using Telegraph Services

Job No. 11

Communications: The Business Letter

Job No. 12

Sources of Information

Job No. 13

Travel Services

Job No. 14

Banking Procedures

Job No. 15

Financial Records

Job No. 16

Secretarial Procedures in Buying and Selling

Job No. 17

Reports, Manuscripts, and Legal Documents

Job No. 18

Meetings and Conferences

Job No. 19

Duplicating Procedures and Equipment

Job No. 20

Office Machines

Job No. 21

Launching Your Secretarial Career

Course Outline (Continued)

Job No. 22

Becoming a Member of the Team

Job No. 23

Looking Ahead to Supervision and Management

OFFICE OCCUPATIONS  
PAYROLL RECORDS AND ACCOUNTING  
Trade Preparatory

C Page 1 of 2

The Payroll Accounting Course was written in 1958 and revised in 1963. It is available in bound form. This material consists of 10 jobs.

The reference for this course is listed below:

Title	Source
John A. Pendery and B. Lewis Keeling PAYROLL RECORDS AND ACCOUNTING, 1963	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio

A detailed outline of the Payroll Accounting Course follows:

Job 1

Need for Payroll Records

Job 2

Computing and Paying Wages and Salaries

Job 3

Old-Age, Survivors', and Disability Benefits and Taxes

Job 4

Federal Unemployment Insurance and Taxes

Job 5

State Unemployment Compensation and Taxes

Job 6

Withholding for Income Tax Purposes

Job 7

Personnel Records

Job 8

Payroll Records

OFFICE OCCUPATIONS  
PAYROLL RECORDS AND ACCOUNTING  
Trade Preparatory

C Page 2 of 2

Course Outline (Continued)

Job 9

Payroll Accounting

Job 10

Project

OFFICE OCCUPATIONS  
PERSONAL DEVELOPMENT  
Trade Preparatory

C Page 1 of 2

The Personal Development Course was written in 1958 and revised in 1963. It is available in bound form. The material covers 21 Lesson Plans.

The references for the Personal Development Course are listed below.

Title	Source
TODAY'S SECRETARY \$4.00	Gregg Publishing Division McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
P. S. FOR PRIVATE SECRETARIES \$15.00	The Bureau of Business Practice 24 Rope Ferry Road Waterford, Connecticut
BETTER SECRETARIES SERIES \$24.00	Prentice-Hall, Inc. Englewood Cliffs, New Jersey

A detailed outline of the Personal Development Course follows:

Lesson Plan 1 - Personalities  
Lesson Plan 2 - Getting a Job  
Lesson Plan 3 - First Job  
Lesson Plan 4 - Secretarial Attitudes  
Lesson Plan 5 - Adjusting to the Job  
Lesson Plan 6 - Secretarial Cooperation  
Lesson Plan 7 - Job Growth  
Lesson Plan 8 - Organization and Planning  
Lesson Plan 9 - Adjusting to Change  
Lesson Plan 10 - Initiative vs. Aggressiveness  
Lesson Plan 11 - Making Compliments Count  
Lesson Plan 12 - The Extemporaneous Talk  
Lesson Plan 13 - The Extemporaneous Talk Cont'd.



OFFICE OCCUPATIONS  
PERSONAL DEVELOPMENT  
Trade Preparatory

C Page 2 of 2.

Course Outline (Continued)

Lesson Plan 14 - Telephone Techniques

Lesson Plan 15 - Tagline for Success

For Men

Lesson Plan 16 - Clean as a Whistle

Lesson Plan 17 - Fit as a Fiddle

Lesson Plan 18 - Time to Attire

Lesson Plan 19 - Strictly Business

For Women

Lesson Plan 16 - You and Your Grooming

Lesson Plan 17 - Your Face

Lesson Plan 18 - Your Hair

Lesson Plan 19 - Your Clothing

Lesson Plan 20 - Your Figure

Lesson Plan 21 - Your Hands and Feet

OFFICE OCCUPATIONS  
POSTING MACHINE  
Trade Preparatory

C Page 1 of 1

The Posting Machine Course was written in 1961. It is available in bound form. The material covers 14 jobs.

Due to the many makes of machines used for this course there can be no one text applicable. Posting data is supplied for each job and the text or reference is obtainable from the instructor.

A detailed outline of the Posting Machine Course follows:

- Job 1 Opening of Accounts and Posting Old Balances
- Job 2 Posting Invoices and Receipts
- Job 3 Posting Invoices and Receipts
- Job 4 Posting Invoices and Receipts
- Job 5 Posting Invoices and Receipts
- Job 6 Posting Invoices and Receipts
- Job 7 Posting Invoices and Receipts
- Job 8 Posting Invoices and Receipts
- Job 9 Posting Invoices and Receipts
- Job 10 Posting Invoices and Receipts
- Job 11 Posting Invoices and Receipts
- Job 12 Opening of Accounts and Posting of Old Balances
- Job 13 Posting Data from Payroll Sheet
- Job 14 Posting Data from Payroll Sheet

OFFICE OCCUPATIONS  
PRINTING CALCULATOR

C Page 1 of 1

The Printing Calculator Course was recently written and is available in bound form. The material covers 12 jobs.

A detailed outline of the Printing Calculator Course follows:

- Job 1 Addition and Subtraction
- Job 2 Multiplication
- Job 3 Cumulative Multiplication
- Job 4 Percentage--Discounts
- Job 5 Use of Constants--Payroll
- Job 6 Division
- Job 7 Averaging
- Job 8 Multi-factor--Multiplication and Division--Interest
- Job 9 Chain Discounts
- Job 10 Proration
- Job 11 Review
- Job 12 Review

OFFICE OCCUPATIONS  
ROTARY CALCULATOR  
Trade Preparatory

C Page 1 of 2

The Rotary Calculator Course was written in 1955 and revised in 1963. It is available in bound form. The material covers 30 jobs.

The reference for the Rotary Calculator Course is listed below:

Title	Source
Agnew and Pasewark ROTARY CALCULATOR COURSE 4th Edition	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio

A detailed outline of the Rotary Calculator Course follows:

- Job 1 - ADDITION - Zeros, One- and Two-Digit Numbers
- Job 2 - ADDITION - Three-, Four- and More-Digit Numbers
- Job 3 - SUBTRACTION
- Job 4 - CONSTANTS - Addition and Subtraction
- Job 5 - SPEED DRILL - Addition
- Job 6 - MULTIPLICATION - Decimals
- Job 7 - MULTIPLICATION - Fixed Decimal Point
- Job 8 - DIVISION
- Job 9 - SPEED DRILL - Subtraction
- Job 10 - TEST NO. 1
- Job 11 - DIVISION - Decimals
- Job 12 - MULTIPLICATION - Accumulative
- Job 13 - PERCENTAGE
- Job 14 - MULTIPLICATION - Negative; Short-Cut Methods
- Job 15 - SPEED DRILL - Multiplication
- Job 16 - MULTIPLICATION - Constant Multiplication; Double Multiplication
- Job 17 - DISCOUNT AND NET AMOUNT

OFFICE OCCUPATIONS  
ROTARY CALCULATOR  
Trade Preparatory

C Page 2 of 2

Course Outline (Continued)

- Job 18 - CHAIN DISCOUNTS
- Job 19 - SPEED DRILL - Division
- Job 20 - TEST NO. 2
- Job 21 - PERCENTAGES OF INCREASE AND DECREASE
- Job 22 - MULTIPLICATION - Compound
- Job 23 - DIVISION - Reciprocal Method
- Job 24 - INTEREST
- Job 25 - SPEED DRILL - Multiplication with Decimals
- Job 26 - ADDITION - Compound
- Job 27 - DIVISION - Build-up Method  
Simultaneous Division and Multiplication
- Job 28 - CREDIT BALANCES
- Job 29 - SPEED DRILL - Division with Decimals
- Job 30 - TEST NO. 3

OFFICE OCCUPATION:  
SALESMANSHIP  
Trade Preparatory

C Page 1 of 3

The Salesmanship Course was revised in 1960. It is available in bound form. This material consists of 30 assignments.

The reference for the Salesmanship Course is listed below:

Title	Source
Wingate-Nolan FUNDAMENTALS OF SELLING, 7th Edition, 1959	South-Western Publishing Co. 5101 Madison Road. Cincinnati 27, Ohio

A detailed outline of the Salesmanship Course follows:

Part I  
Chapter I  
Assignment 1 - What is Selling?

Part I  
Chapter II  
Assignment 2 - Types of Selling

Part I  
Chapter III  
Assignment 3 - How Goods Reach the Consumer

Test No. 1--Part I

Part II  
Chapter IV  
Assignment 4 - Why the Consumer Buys

Part II  
Chapter V  
Assignment 5 - Analysis of Customer Demand

Part II  
Chapter VI  
Assignment 6 - Consumer Goods

Part II  
Chapter VII  
Assignment 7 - Market Resources for Consumer Goods

Test No. 2--Part II

Part III  
Chapter VIII  
Assignment 8 - The Seller's Personality--Physical  
Characteristics

OFFICE OCCUPATIONS  
SALESMANSHIP  
Trade Preparatory

C Page 2 of 3

Course Outline (Continued)

Part III

Chapter IX

Assignment 9 - The Seller's Personality--Mental  
Characteristics

Part III

Chapter X

Assignment 10 - The Seller's Use of English

Part III

Chapter XI

Assignment 11 - The Seller's Use of Arithmetic

Test No. 3--Part III

Part IV

Chapter XII

Assignment 12 - The Technique of Locating Customers

Part IV

Chapter XIII

Assignment 13 - Preparing to Meet Customers

Part IV

Chapter XIV

Assignment 14 - Opening the Sale

Part IV

Chapter XV

Assignment 15 - Analyzing the Customer's Wants

Part IV

Chapter XVI

Assignment 16 - Presenting a Planned Sales Story

Part IV

Chapter XVII

Assignment 17 - Handling the Customer's Objections

Part IV

Chapter XVIII

Assignment 18 - Closing the Sale

Part IV

Chapter XIX

Assignment 19 - Plus Selling

Test No. 4--Part IV



Course Outline (Continued)

Part V

Chapter XX

Assignment 20 - Advertising as a Sales Tool

Part V

Chapter XXI

Assignment 21 - Selling by Means of Letters

Part V

Chapter XXII

Assignment 22 - Selling by Means of Effective Display

Part V

Chapter XXIII

Assignment 23 - Selling by Telephone

Part V

Chapter XXIV

Assignment 24 - Selling by Means of Radio, Television, and  
Other Presentations

Test No. 5--Part V

Part VI

Chapter XXV

Assignment 25 - Sales Promotion Policies

Part VI

Chapter XXVI

Assignment 26 - Business Service Policies

Part VI

Chapter XXVII

Assignment 27 - Ethical Treatment of Customers

Part VI

Chapter XXVIII

Assignment 28 - Ethical Treatment of Competitors and Others

Part VI

Chapter XXIX

Assignment 29 - Meeting the Demands of Modern Consumer

Test No. 6--Part VI

Part VII

Chapter XXX

Assignment 30 - How to Secure a Job

OFFICE OCCUPATIONS  
SHORTHAND  
Trade Preparatory

C Page 1 of 4

The Shorthand Course was written in 1955 and rewritten in 1958. It is available in bound form. The material covers 70 jobs.

The reference for Shorthand Course is listed below.

Title	Source
Leslie, Zoubek, Hosler, GREGG SHORTHAND SIMPLIFIED FOR COLLEGES, Volume 1, 2nd Edition	Gregg Publishing Division McGraw-Hill Book Co., Inc. 330 West 42 nd Street New York 36, New York

The detailed outline of the Shorthand Course follows:

Job 1  
Paragraph 1 through 11  
Job 2  
Paragraph 12 through 17  
Job 3  
Paragraph 18 through 23  
Job 4  
Paragraph 24 through 31  
Job 5  
Paragraph 32 through 40  
Job 6  
Paragraph 41 through 53  
Job 7  
Paragraph 54 through 61  
Job 8  
Paragraph 62 through 71  
Job 9  
Paragraph 72 through 80  
Job 10  
Paragraph 81 through 92  
Job 11  
Paragraph 93 through 102  
Job 12  
Paragraph 103 through 111  
Job 13  
Paragraph 112 through 118  
Job 14  
Paragraph 119 through 125  
Job 15  
Paragraph 126 through 133  
Job 16  
Paragraph 134 through 142  
Job 17  
Paragraph 143 through 150  
Job 18  
Paragraph 151 through 161

Course Outline (Continued)

- Job 19
  - Paragraph 162 through 169
- Job 20
  - Paragraph 170 through 179
- Job 21
  - Paragraph 180 through 187
- Job 22
  - Paragraph 188 through 196
- Job 23
  - Paragraph 197 through 205
- Job 24
  - Paragraph 206 through 210
- Job 25
  - Paragraph 211 through 219
- Job 26
  - Paragraph 220 through 231
- Job 27
  - Paragraph 232 through 242
- Job 28
  - Paragraph 243 through 252
- Job 29
  - Paragraph 253 through 263
- Job 30
  - Paragraph 264 through 269
- Job 31
  - Paragraph 270 through 281
- Job 32
  - Paragraph 282 through 289
- Job 33
  - Paragraph 290 through 300
- Job 34
  - Paragraph 301 through 307
- Job 35
  - Paragraph 308 through 315
- Job 36
  - Paragraph 316 through 320
- Job 37
  - Paragraph 321 through 332
- Job 38
  - Paragraph 333 through 345
- Job 39
  - Paragraph 346 through 352
- Job 40
  - Paragraph 353 through 359
- Job 41
  - Paragraph 360 through 368
- Job 42
  - Paragraph 369 through 375

Course Outline (Continued)

- Job 43
  - Paragraph 376 through 383
- Job 44
  - Paragraph 384 through 390
- Job 45
  - Paragraph 391 through 398
- Job 46
  - Paragraph 399 through 407
- Job 47
  - Paragraph 408 through 417
- Job 48
  - Paragraph 418 through 423
- Job 49
  - Paragraph 424 through 433
- Job 50
  - Paragraph 434 through 444
- Job 51
  - Paragraph 444 through 453
- Job 52
  - Paragraph 454 through 461
- Job 53
  - Paragraph 462 through 469
- Job 54
  - Paragraph 470 through 474
- Job 55
  - Paragraph 475 through 480
- Job 56
  - Paragraph 481 through 486
- Job 57
  - Paragraph 487 through 494
- Job 58
  - Paragraph 495 through 500
- Job 59
  - Paragraph 501 through 505
- Job 60
  - Paragraph 506 through 510
- Job 61
  - Paragraph 511 through 515
- Job 62
  - Paragraph 516 through 521
- Job 63
  - Paragraph 522 through 526
- Job 64
  - Paragraph 527 through 531
- Job 65
  - Paragraph 532 through 536
- Job 66
  - Paragraph 537 through 540

OFFICE OCCUPATIONS  
SHORTHAND  
Trade Preparatory

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Course Outline (Continued)

Job 67

Paragraph 541 through 546

Job 68

Paragraph 547 through 551

Job 69

Paragraph 552 through 555

Job 70

Paragraph 556 through 562

The Spelling Course was written in 1955 and rewritten in 1958 and again in 1962. It is available in loose leaf form. An Instructor's Guide is available in book form. The material covers 38 jobs.

The reference for the Spelling Course is listed below:

Title	Source
Oberly-Silverthorn COLLEGE SPELLING for Businessman's Vocabulary 3rd Edition	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio

The detailed outline of the Spelling Course follows:

Introduction

- Job 1 - Student Study Sheet
- Job 2 - Unit I - Adding a Suffix
- Job 3 - Unit I - Adding a Suffix
- Job 4 - Unit II - Working With Words
- Job 4A - Rules of Hyphenation
- Job 5 - Unit II - Working With Words
- Job 6 - Unit III - Words Ending in Silent "e," "ie," & "y"
- Job 7 - Unit III - Words Ending in Silent "e," "ie," & "y"
- Job 8 - Unit III - Words Ending in Silent "e," "ie," & "y"
- Job 9 - Unit IV - Words Containing "ei" & "ie" Sequences
- Job 10 - Unit IV - Words Containing "ei" & "ie" Sequences
- Job 11 - Unit V - Plural Form of Nouns
- Job 12 - Unit V - Plural Form of Nouns
- Job 13 - Unit V - Plural Form of Nouns
- Job 14 - Unit VI - Possessive Forms of Nouns
- Job 15 - Unit VI - Possessive Forms of Nouns

Course Outline (Continued)

- Job 16 - Unit VI - Possessive Forms of Nouns
- Job 17 - Unit VII - How to Build and Spell Related Words -  
Prefixes
- Job 18 - Unit VII - How to Build and Spell Related Words -  
Prefixes
- Job 19 - Unit VIII - Suffixes
- Job 20 - Unit VIII - Suffixes
- Job 21 - Unit VIII - Suffixes
- Job 22 - Unit IX - Troublesome Suffixes
- Job 23 - Unit IX - Troublesome Suffixes
- Job 24 - Unit IX - Troublesome Suffixes
- Job 25 - Unit IX - Troublesome Suffixes
- Job 26 - Unit IX - Troublesome Suffixes
- Job 27 - Unit IX - Troublesome Suffixes
- Job 28 - Unit X - Troublesome Suffixes (Continued)
- Job 29 - Unit X - Troublesome Suffixes (Continued)
- Job 30 - Unit X - Troublesome Suffixes (Continued)
- Job 31 - Unit XI - Troublesome Suffixes (Concluded)
- Job 32 - Unit XI - Troublesome Suffixes (Concluded)
- Job 33 - Unit XI - Troublesome Suffixes (Concluded)
- Job 34 - Unit XII - Synonyms
- Job 35 - Unit XII - Synonyms
- Job 36 - Unit XIII - Miscellaneous Words
- Job 37 - Unit XIV - Miscellaneous Words (Continued)
- Job 38 - Unit XV - Miscellaneous Words (Concluded)



OFFICE OCCUPATIONS  
TEN-KEY ADDING-LISTING MACHINE  
Trade Preparatory

C Page 1 of 2

The Ten-Key Adding-Listing Machine Course was written in 1955 and revised in 1963. It is available in bound form. This material consists of 30 jobs.

The reference for this course is listed below.

Title	Source
Agnew-Pasewark TEN-KEY ADDING-LISTING AND PRINTING CALCULATOR COURSE Third Edition	South-Western Publishing Co. 5101 Madison Road Cincinnati 27, Ohio

A detailed outline of the Ten-Key Adding-Listing Machine Course follows.

- Job 1 Touch Addition
- Job 2 Touch Addition
- Job 3 Addition of Numbers Containing Repeated Digits and Varied Number of Digits
- Job 4 Subtraction and Correction of Errors
- Job 5 Speed Drill--Addition
- Job 6 Sub-Total Key
- Job 7 Repeat Addition
- Job 8 Multiplication
- Job 9 Speed Drill--Addition
- Job 10 Test No. 1
- Job 11 Short-Cut Multiplication--Zeros in the Multiplier
- Job 12 Decimals, Fractions, and Percentages
- Job 13 Fixed Decimal Point
- Job 14 Discount and Net Amount
- Job 15 Speed Drill--Addition
- Job 16 Chain Discounts

OFFICE OCCUPATIONS  
TEN-KEY ADDING-LISTING MACHINE  
Trade Preparatory

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Course Outline (Continued)

- Job 17 Constant Multiplication
- Job 18 Division
- Job 19 Speed Drill-Addition
- Job 20 Test No. 2
- Job 21 Division {Remainder in Quotient)  
{Decimals in Quotient)  
{Decimals in Dividend and Divisor)
- Job 22 Credit Balances
- Job 23 Interest
- Job 24 Percentage of Increase and Decrease
- Job 25 Speed Drill-Addition
- Job 26 Prorating
- Job 27 Payrolls
- Job 28 Reconciliation of Bank Statements
- Job 29 Speed Drill-Addition
- Job 30 Test No. 3

OFFICE OCCUPATIONS  
TYPEWRITING  
Trade Preparatory

The Typewriting material was revised in 1966. It is available in book form. This material covers thirty five units.

The reference for this course is listed below.

Title

Source

Lloyd, Rowe, and Winger  
GREGG TYPEWRITING FOR COLLEGES  
Second Edition

Gregg Publishing Division  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York

PRACTICAL NURSE EDUCATION  
Trade Preparatory

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The Practical Nurse Course was published in 1954 and Book I and Book II revised in 1959, Book III revised in 1960.

Book I - Jobs (Related Study Assignments and Procedure Sheets)

Book II - Jobs (Related Study Assignments and Procedure Sheets)

Book III

The references for the Practical Nurse Education Course are the following:

Title	Source
BOOK I	
Dakin, Thompson, LeBaron, SIMPLIFIED NURSING, Sixth Ed., 1956	J. B. Lippincott Company Philadelphia, Pa.
Gill, Helen, BASIC NURSING, Fourth Ed., 1958	The Macmillan Company Sixty Fifth Avenue New York 44, New York
Rapier, PRACTICAL NURSING, 1st Ed., 1958	C. V. Mosby St. Louis, Missouri
Tabers, MEDICAL DICTIONARY	J. A. Majors Company New Orleans, Louisiana
State Department of Health, SANITARY CODE	U. S. Government Printing Office Washington 25, D. C.
Van Bearson, Carolyn, GETTING READY TO BE A MOTHER	The Macmillan Company Sixty Fifth Avenue New York 44, New York
Gorbin, Hazel, GETTING READY TO BE A FATHER	The Macmillan Company Sixty Fifth Avenue New York 44, New York
PRENATAL CARE	U. S. Government Printing Office Washington, D. C.
Federal Security Agency, PRENATAL CARE	U. S. Government Printing Office Washington 25, D. C.
Children's Bureau Publishers No. 325 PREMATURE INFANTS	U. S. Government Printing Office Washington 25, D. C.

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References (Continued)

Title

Source

BOOK I (Continued)

PREMATURE MANUAL OF MEDICAL  
AND NURSING PROCEDURES

Charity Hospital  
New Orleans, Louisiana

Wallinger,  
NURSING CARE OF PREMATURE  
INFANTS

American Journal of Nursing

Children's Bureau Publication,  
INFANT CARE No. 8, 1951

U. S. Government Printing Office  
Washington 25, D. C.

YOUR CHILD FROM ONE TO SIX  
YOUR CHILD FROM SIX TO TWELVE

U. S. Children's Bureau  
Publication 30

SOME SPECIAL PROBLEMS OF  
CHILDREN

National Mental Health  
Foundation

GUIDING THE ADOLESCENT

Children's Bureau Publication  
225

Weiss, M. Olga,  
ATTITUDES IN PSYCHIATRIC  
NURSING CARE

G. P. Putnam's Sons  
210 Madison Avenue  
New York 16, New York

Roberson,  
PSYCHIATRIC AIDE

The Macmillan Company  
Sixty Fifth Avenue  
New York 44, New York

BOOK II

Wiship,  
TOGETHER WE WORK

American Dietetic Association

Rust, Justin,  
TODAYS HOME LIVING

J. B. Lippincott Co.  
Philadelphia, Pa.

Mitchell and Bernard,  
FOOD IN HEALTH AND DISEASE

F. A. Davis Company  
Philadelphia, Pennsylvania

Peyton,  
PRACTICAL NUTRITION

J. B. Lippincott Company  
Philadelphia, Pennsylvania

Howe,  
NUTRITION FOR PRACTICAL NURSES

W. B. Saunders Company  
Philadelphia, Pennsylvania

PRACTICAL NURSE EDUCATION  
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References (Continued)

Title	Source
BOOK II (Continued)	
Bulletins THE HEART OF THE HOME	American Heart Association
MANAGE YOUR TIME	Louisiana State University Baton Rouge, Louisiana
WAYS TO CONSERVE TIME AND ENERGY	Bureau of Educational Service Washington
HOUSE CLEANING MANAGEMENT AND METHODS	Farmers Bulletin #1834 U. S. D. A.
Hurst, THE 1-2-3 OF HOMEMAKING	Prentice Hall Englewood Cliffs, New Jersey
Moore, WHAT SHALL WE EAT AND WHY	State Department of Health
FOOD FACTS	American Dietetic Association
FAMILY FARE	United States Department of Agriculture
Harris Henderson, FOODS	D. C. Heath and Company 285 Columbus Avenue Boston 16, Massachusetts
Bulletin: L.S.U.; HARMONY IN TABLE SETTING AND SERVICE	County Home Demonstration Agent
Bulletin: MEAT FOR THRIFTY MEALS	U. S. D. A.
Darling EMOTIONAL FACTORS IN OBESITY AND WEIGHT	American Dietetic Association

PRACTICAL NURSE EDUCATION  
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A detailed outline of the Practical Nurse Education Course follows:

BOOK I

Job 1

P.S. - Pretest in  
Arithmetic

- R.S.A. 1 - History of Practical Nursing
- R.S.A. 2 - Orientation - Co-workers and Community
- R.S.A. 3 - Classifications and Organization of Hospitals
- R.S.A. 4 - Orientation - School and Hospital
- R.S.A. 5 - Orientation - How to Study
- R.S.A. 6 - Mathematics - Table of Whole Numbers

Job 2 - Set Up a Patient Unit

P.S. 1 - How to Clean and Care for Supplies and Equipment

P.S. 2 - How to Strip a Bed, Dispose of Soiled Linen and Care for Equipment

P.S. 3 - How to Care for Cleaning Equipment and Dispose of Waste

P.S. 4 - How to Arrange Equipment and Restock Patient's Unit

P.S. 5 - How to Make a Closed and Open Bed

R.S.A. 1 - Introduction to Health and the Importance of Cleanliness

R.S.A. 2 - Selection of Bedmaking Supplies

R.S.A. 3 - Principles of Heat, Light and Ventilation

R.S.A. 4 - Working Relations - The Nurse in the Home

R.S.A. 5 - Introduction to Charting - Letters and Rules of Punctuation

R.S.A. 6 - Mathematics: Addition of Whole Numbers

R.S.A. 7 - Mathematics: Subtraction of Whole Numbers

R.S.A. 8 - Mathematics: Multiplication of Whole Numbers

R.S.A. 9 - Mathematics: Division of Whole Numbers

R.S.A. 10 - How to Regulate Heat, Light and Ventilation

Job 3 - Care and Maintenance of Linen and Utility Rooms and Medicine Cabinets

P.S. 1 - How to Maintain Orderly Linen and Utility Rooms

R.S.A. 1 - Introduction to Charting Numerals



PRACTICAL NURSE EDUCATION  
Trade Preparatory

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Course Outline (Continued)

BOOK I (Continued)

Job 3 (Continued)

- |  |   |
|--|---|
| P.S. 2 - How to Clean Linen and Utility Rooms, Check and Obtain Linen Supply | R.S.A. 2 - Mathematics: Fractions                             |
| P.S. 3 - How to Clean, Arrange and Maintain Medicine Cabinet                 | R.S.A. 3 - Care and Storage of Medicines in Hospital and Home |
|  | R.S.A. 4 - Mathematics: Addition of Fractions                 |
|  | R.S.A. 5 - Subtraction of Fractions                           |
|  | R.S.A. 6 - Multiplication and Division of Fractions           |

Job 4 - Admit the Patient

- |  |  |
|--|--|
| P.S. 1 - How to Assemble and fill out a clinical chart                             | R.S.A. 1 - Introduction to Body Structure and Function           |
| P.S. 2 - How to Get the Patient into Bed   | R.S.A. 2 - Working Relationships                                 |
| P.S. 3 - How to Place the Patient upon Stretcher and remove Patient From Stretcher | R.S.A. 3 - Mathematics - Decimals                                |
| P.S. 4 - How to Undress the Patient  | R.S.A. 4 - Mathematics - Addition and Subtraction of Decimals    |
| P.S. 5 - How to Put on a Gown or Pajamas   | R.S.A. 5 - Mathematics - Multiplication and Division of Decimals |
| P.S. 6 - How to Care for Clothing and Valuables                                    | R.S.A. 6 - Admission of Patient to Hospital                      |
| P.S. 7 - How to Get Patient Out of Bed   | R.S.A. 7 - Temperature, Pulse and Respiration                    |
| P.S. 8 - How to Take Temperatures  |  |
| P.S. 9 - How To Clean and Disinfect Clinical Thermometers                          |  |
| P.S. 10 - How to Take a Rectal Temperature   |  |
| P.S. 11 - How to Count the Pulse   |  |
| P.S. 12 - How to Count Respiration   |  |
| P.S. 13 - How to Give and Remove a Bedpan  |  |

Course Outline (Continued)

BOOK I (Continued)

Job 4 (Continued)

- P.S. 14 - How To Give and Remove a Urinal
- P.S. 15 - How to Collect a Voided Specimen of Urine From an Adult
- P.S. 16 - How to Measure Fluid Intake and Output
- P.S. 17 - How to Weigh and Measure an Adult Patient

Job 5 - Make a Patient Comfortable.

- |  |   |
|--|---|
| P.S. 1 - How to Maintain Good Body Alignment                                     | R.S.A. 1 - The Skeletal System  |
| P.S. 2 - How to Give Oral Hygiene and Care of Dentures                           | R.S.A. 2 - The Muscular System  |
| P.S. 3 - How to Prepare a Patient for a Meal, Serve a Tray, and Feed the Patient | R.S.A. 3 - The Skin   |
| P.S. 4 - How to Remove Gown or Pajamas   | R.S.A. 4 - The Digestive System   |
| P.S. 5 - How to Give A.M. Care   | R.S.A. 5 - Personal Hygiene in Relation to Skin, Hair, Nails, Posture, Feet, Mouth and Food |
| P.S. 6 - How to Give a Bed Bath  |   |
| P.S. 7 - How to Give a Partial Bath  |   |
| P.S. 8 - How to Give a Tub Bath  |   |
| P.S. 9 - How to Give Shower Bath   |   |
| P.S. 10 - How to Give Back Rub   |   |
| P.S. 11 - How to Care for Fingernails and Toenails                               |   |
| P.S. 12 - How to Brush and Comb Hair   |   |
| P.S. 13 - How to Give Treatment for Pediculi                                     |   |

Course Outline (Continued)

BOOK I (Continued)

Job 5 (Continued)

- P.S. 14 - How to Make an Occupied Bed
- P.S. 15 - How to Make an Occupied Bed From Head to Foot
- P.S. 16 - How to Give Shampoos
- P.S. 17 - How to Care for Flowers
- P.S. 18 - How to Use Bedside Rails
- P.S. 19 - How to Fill and Apply an Ice Cap
- P.S. 20 - How to Fill Hot Water Bottle and Apply Heating Pad
- P.S. 21 - How to Give Evening Care
- P.S. 22 - How to Apply Supporting Measures

Job 6 - Transfer the Patient

- P.S. 1 - How to Put Patient into a Wheel Chair
- P.S. 2 - How to Transfer a Patient
- R.S.A. 1 - Mathematics--Percentage

Job 7 - Discharge a Patient

- P.S. 1 - How to Return Valuables, Dress, and Discharge a Patient
- R.S.A. 1 - Discharging a Patient
- R.S.A. 2 - Mathematics--The Metric System

Job 8 - Physical Examination of Adult

- P.S. 1 - How to Assemble Supplies, Prepare a Patient and Assist Physician with an Examination
- P.S. 2 - How to Care for the Clean Instruments
- P.S. 3 - How to Handle Sterile Supplies
- P.S. 4 - How to Take Blood Pressure
- R.S.A. 1 - Discovering Health Assets and Liabilities
- R.S.A. 2 - The Care and Cleaning of Instruments
- R.S.A. 3 - Sterilization
- R.S.A. 4 - Working Relationships

PRACTICAL NURSE EDUCATION  
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Course Outline (Continued)

BOOK I (Continued)

Job 9 - Care of Pre-operative and Post-operative Patients

- |  |  |
|--|--|
| P.S. 1 - How to "Prepare" a Patient for Surgery                                  | R.S.A. 1 - Principles of Surgical Nursing            |
| P.S. 2 - How to Dress a Patient for Surgery                                      | R.S.A. 2 - Regulations for the Use of Narcotics      |
| P.S. 3 - How to Prepare and Give a Hypodermic                                    | R.S.A. 3 - Anesthetics                               |
| P.S. 4 - How to Make a Recovery Bed  | R.S.A. 4 - Treatment of Shock (Medical and Surgical) |
| P.S. 5 - How to Set Up a Surgical Dressing Tray and Change Dressings             | R.S.A. 5 - Cancer                                    |
|  | R.S.A. 6 - Allergy                                   |
|  | R.S.A. 7 - Burns                                     |
|  | R.S.A. 8 - The Use and Care of Syringes and Needles  |
| P.S. 6 - How to Assist with an Intravenous Infusion-Hypodermoclysis and Cut Down |  |
| P.S. 7 - How to Care for Selected Patients Reacting from an Anesthetic           |  |
| P.S. 8 - How to Set Up and Care for Suction Drainage Apparatus                   |  |
| P.S. 9 - How to Insert a Rectal Tube   |  |
| P.S. 10 - How to Give Intramuscular Injections                                   |  |
| P.S. 11 - How to Care for a Patient in Shock                                     |  |
| P.S. 12 - How to Use the Davis Patient Roller                                    |  |
| P.S. 13 - How to Apply Breast, Abdominal, and T-Binders                          |  |

Job 10 - Care of a Patient in an Isolated Unit

- |  |  |
|--|--|
| P.S. 1 - How to Set Up a Unit for Isolated Patient | R.S.A. 1 - Principles of Communicable Disease Nursing              |
| P.S. 2 - How to Put on Gown and Mask               | R.S.A. 2 - Communicable Disease Control                            |
| P.S. 3 - How to Care for Valuables and Clothing    | R.S.A. 3 - Working with Patients, Families, and Community Agencies |

Course Outline (Continued)

BOOK I (Continued)

Job 10 (Continued)

- P.S. 4 - How to Care for  
Body Excreta
- P.S. 5 - How to Care for  
Bed Linens
- P.S. 6 - How to Care for  
Dishes
- P.S. 7 - How to Care for  
Mattresses, Pillows,  
and Floors

Job 11 - Care of a Patient With Disease or Condition of the  
Reproductive System

- |  |  |
|--|--|
| P.S. 1 - How to Give a<br>Vaginal<br>Irrigation                                | R.S.A. 1 - Structure and Function<br>of the Male and Female<br>Reproductive System |
| P.S. 2 - How to Insert a<br>Vaginal Suppository<br>or Instill Vaginal<br>Cream | R.S.A. 2 - Some diseases of the<br>Reproductive System                             |

Job 12 - Care of the Patient with Kidney and Bladder Disorder

- |  |  |
|--|--|
| P.S. 1 - How to Do a<br>Catheterization      | R.S.A. 1 - Structure and Function<br>of the Urinary System |
| P.S. 2 - How to Do a<br>Bladder Irrigation   | R.S.A. 2 - Some Disorders of the<br>Urinary System         |
| P.S. 3 - How to Do a Bladder<br>Instillation | R.S.A. 3 - Review Metric System                            |
| P.S. 4 - How to Assist with<br>a P.S.P. Test |  |
| P.S. 5 - How to Test Urine for<br>Albumin    |  |

Job 13 - Care of the Male Patient With Prostatic Resection

- |   |  |
|---|--|
| P.S. 1 - How to Care for a<br>Patient with a<br>Prostatic Resection | R.S.A. 1 - Structure and Function<br>of the Male Genito-<br>Urinary System |
|---|--|

PRACTICAL NURSE EDUCATION  
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Course Outline (Continued)

BOOK I (Continued)

Job 14 - Care of Patient with Disease or Condition of the  
Digestive System.

- |   |  |
|---|--|
| P.S. 1 - How to Give a Sitz Bath  | R.S.A. 1 - Structure and Function of the Digestive System                  |
| P.S. 2 - How to Give Oral Medications                                       | R.S.A. 2 - Some of the Diseases and Conditions of the Digestive System     |
| P.S. 3 - How to Collect a Specimen of Feces                                 | R.S.A. 3 - Collecting a Specimen of Feces for an Adult or Child            |
| P.S. 4 - a. How to Give Enemas (Cleansing)                                  | R.S.A. 4 - Administration of Drugs by Mouth                                |
| b. How to Give Enemas (Retention)   | R.S.A. 5 - Preparation of a Patient For X-ray and Fluoroscopic Examination |
| c. How to Give Enemas (Proctocylsis)  | R.S.A. 6 - Community Health in Relation of Disease of Digestive System     |
| P.S. 5 - How to Insert a Rectal Suppository                                 | R.S.A. 7 - Mathematics - The Apothecary System                             |
| P.S. 6 - How to Remove a Fecal Impaction                                    |  |
| P.S. 7 - How to Give a Colonic Flush  |  |
| P.S. 8 - How to Collect a Specimen of Vomitus                               |  |
| P.S. 9 - How to Give Liquid Feedings Through Indwelling Tube                |  |
| P.S. 10 - How to Assist with a Gastric Analysis                             |  |
| P.S. 11 - How to Assist with the Removal of Fluid from the Abdominal Cavity |  |
| P.S. 12 - How to Care for a Colostomy                                       |  |
| P.S. 13 - How to Prepare a Patient for X-Ray and Fluoroscopic Examinations  |  |

Job 15 - Care of the Patient with Disease or Condition of the  
Endocrine System

- |   |   |
|---|---|
| P.S. 1 - How to Prepare Patient for Basal Metabolism Rate (BMR) | R.S.A. 1 - Structure and Function of the Endocrine Glands and Their Relationship to Other Body Structures and Functions |
|---|---|



Course Outline (Continued)

BOOK I (Continued)

Job 15 (Continued)

- |  |  |
|--|--|
| P.S. 2 - How to Test Urine for Sugar and Acetone       | R.S.A. 2 - Some Conditions and Diseases of the Endocrine System-medical and Surgical Aspects |
| P.S. 3 - How to Measure and Give Insulin by Hypodermic | R.S.A. 3 - Types of Tests  |
| P.S. 4 - How to Collect a 24 Hour Specimen of Urine    |  |

Job 16 - Care of Patient with Circulatory Condition

- |   |   |
|---|---|
| P.S. 1 - How to Assist in Obtaining a Blood Specimen                      | R.S.A. 1 - Structure and Function of the Circulatory System |
| P.S. 2 - How to Shave a Male Patient                                      | R.S.A. 2 - Some of the Diseases of the Circulatory System   |
| P.S. 3 - How to Assist in the Administration of Oxygen and Carbon Dioxide | R.S.A. 3 - Blood Pressure                                   |
| P.S. 4 - How to Give a Temperature Bath                                   | R.S.A. 4 - Temperature, Pulse and Respiration               |
|   | R.S.A. 5 - Legal Responsibilities of the Practical Nurse    |
|   | R.S.A. 6 - Effects of Heat and Cold on Body                 |

Job 17 - Care of Patient with a Respiratory Disease or Condition

- |  |  |
|--|--|
| P.S. 1 - How to Collect Sputum Specimen                        | R.S.A. 1 - Structure and Function of the Respiratory System              |
| P.S. 2 - How to Assist in Obtaining a Nose and Throat Specimen | R.S.A. 2 - Some Diseases of the Respiratory System                       |
| P.S. 3 - How to Administer Throat Gargle                       | R.S.A. 3 - Collecting Specimens from Respiratory Structures              |
| P.S. 4 - How to Administer a Nasal or throat Spray             | R.S.A. 4 - Counterirritants  |
| P.S. 5 - How to Give a Steam Inhalation                        | R.S.A. 5 - Community Health Problems in Relation to Respiratory Diseases |
| P.S. 6 - How to Assist with Aspiration of the Chest Cavity     | R.S.A. 6 - Mathematics--Equivalents                                      |
| P.S. 7 - How to Administer Medication by Nebulizer             | R.S.A. 7 - Tuberculosis  |



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Course Outline (Continued)

BOOK I (Continued)

Job 18 - Care of Patient with Skin Disease

- |   |  |
|---|--|
| P.S. 1 - How to Apply Liquid or Ointment      | R.S.A. 1 - Structure and Function of the Skin                                  |
| P.S. 2 - How to Apply Hot and Cold Compresses | R.S.A. 2 - Diseases and Conditions of the Skin                                 |
| P.S. 3 - How to Give Foot or Arm Bath         | R.S.A. 3 - Individual and Community Health in Relation to Diseases of the Skin |

Job 19 - Care of Patient with Diseases or Conditions of the Bones and Joints

- |   |   |
|---|---|
| P.S. 1 - How to Assist Patient with use of Crutches | R.S.A. 1 - Care of Patients with Diseases or Conditions of the Bones and Joints |
| P.S. 2 - How to Care for the Orthopedic Patient     |   |

Job 20 - Care of a Patient with Conditions and Diseases Affecting Muscles

- |  |  |
|--|--|
| P.S. 1 - How to Prevent and Care for Bed Sores | R.S.A. 1 - Muscular System Review                    |
|  | R.S.A. 2 - Diseases and Conditions Affecting Muscles |

Job 21 - Care of the Maternity Patient

- |  |                                    |
|--|------------------------------------|
| P.S. 1 - How to Give Perineal Care                         | R.S.A. 1 - Review R.S.A. 1 -Job 11 |
| P.S. 2 - How to Give Perineal Light Treatment              | R.S.A. 2 - The Prenatal Period     |
|  | R.S.A. 3 - The Birth Process       |
| P.S. 3 - Breast Care to the Nursing and Non-nursing Mother | R.S.A. 4 - The Postnatal Period    |

Job 22 - Care of the Newborn Infant

- |  |                                 |
|--|---------------------------------|
| P.S. 1 - How to Set up a Nursery Unit            | R.S.A. 1 - Care of the Newborn  |
| P.S. 2 - How to Care for the Eyes of the Newborn | R.S.A. 2 - The Premature Infant |
| P.S. 3 - How to Express Mucous from the Newborn  |                                 |

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Course Outline (Continued)

BOOK I (Continued)

Job 22 (Continued)

- P.S. 4 - How to Weigh and Measure an Infant
- P.S. 5 - How to Care for the Umbilical Cord
- P.S. 6 - Bathe the Newborn (First Oil and Water Bath)
- P.S. 7 - How to Care for and Wash Soiled Diapers
- P.S. 8 - How to Restrain an Infant or Child
- P.S. 9 - How to Assist with Physical Examination of an Infant
- P.S. 10 - How to Assist with Breast Feeding
- P.S. 11 - How to Prepare and Give Formula Feedings
- P.S. 12 - How to Collect a Urine Specimen from Infants

Job 23 - Care of Children

- |  |  |
|--|--|
| P.S. 1 - How to Prepare and Give Foods Other Than Milk | R.S.A. 1 - The Infant - Its Growth and Development |
|  | R.S.A. 2 - How a Child Grows and Develops          |
|  | R.S.A. 3 - Immunization                            |
|  | R.S.A. 4 - An Approach to Understanding Children   |
|  | R.S.A. 5 - Childhood Diseases                      |

Job 24 - Care of the Patient with Disease or Conditions of the Nervous System

- |   |   |
|---|---|
| P.S. 1 - How to Assist with a Lumbar Puncture | R.S.A. 1 - The Structure and Function of the Nervous System |
|   | R.S.A. 2 - Mental Health                                    |
|   | R.S.A. 3 - Conditions and Diseases of the Nervous System    |

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Course Outline (Continued)

BOOK I (Continued)

Job 24 (Continued)

R.S.A. 4 - Techniques of Caring  
for Patient with  
Mental and Emotional  
Conditions

R.S.A. 5 - Special Therapies

Job 25 - Care of Patient with Disease or Condition of the Eye

P.S. 1 - How to Give Eye  
Drops

P.S. 2 - How to Give an  
Eye Irrigation

P.S. 3 - How to Apply an  
Ointment to the  
Eye

P.S. 4 - How to Remove  
Non-embedded  
Foreign Body  
from Eye

P.S. 5 - How to Care for the  
Prosthetic Eye of  
a Patient

R.S.A. 1 - Structure and Function  
of the Eye

R.S.A. 2 - Some Diseases and  
Conditions of the Eye

Job 26 - Care of Patient with Ear, Nose, or Throat Disease  
or Condition

P.S. 1 - How to Administer  
Nose Drops

P.S. 2 - How to Administer  
Ear Drops

P.S. 3 - How to Assist with  
the Care of a  
Patient with a  
Tracheotomy Tube

P.S. 4 - How to Care for a  
Patient with a  
Hearing Aid

R.S.A. 1 - Structure and Function  
of the Ear, Nose, and  
Throat

R.S.A. 2 - Diseases of Ear, Nose,  
and Throat

Job 27 - Care of the aging and Old Patients

R.S.A. 1 - The Aging Process

R.S.A. 2 - Some Diseases and  
Conditions Common  
to the Later Years

PRACTICAL NURSE EDUCATION  
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Course Outline (Continued)

BOOK I (Continued)

Job 28 - Care for the Dying Patient

R.S.A. 1 - Care for the Dying Patient

Job 29 - Care for the Body After Death

P.S. 1 - How to Care for the Body After Death

R.S.A. 1 - Care for the Body After Death

Job 30 - Relationships with Co-workers

R.S.A. 1 - Applying for Employment

R.S.A. 2 - Resigning and Leaves of Absence

R.S.A. 3 - Community Relationships

R.S.A. 4 - Evening and Night Nursing

BOOK II

Job 1 - Orientation

P.S. 1 - How to Get Acquainted With the Foods and Cookery Laboratory

P.S. 2 - Food Handling Techniques

P.S. 3 - How to Sterilize Dishes

P.S. 4 - How to Measure Food

R.S.A. 1 - Introduction to the Homemaking Course Designed to Meet the Needs of the Practical Nurse

R.S.A. 2 - Storage and Use of Equipment in the Foods and Cookery Laboratory

R.S.A. 3 - Introduction to Foods and Cookery Designed to Meet the Needs of the Practical Nurse

R.S.A. 4 - Food and Health

R.S.A. 5 - Adequate and Safe Storage of Food

Job 2 - Working Efficiently

P.S. 1 - How to Apply Work Simplification

R.S.A. 1 - Application to Work Simplification - Efficiency in Cleaning

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Course Outline (Continued)

BOOK II (Continued)

Job 3 - Evaluate Dietary

- |   |  |
|---|--|
| P.S. 1 - How to Use Seven<br>Basic Food Groups<br>to Evaluate a<br>Dietary Record | R.S.A. 1 - Essentials of a Good<br>Diet                                |
| P.S. 2 - How to Use the Basic<br>Four in Everyday<br>Diet                         | R.S.A. 2 - The Nutrients -<br>Carbohydrates, Proteins,<br>and Fats     |
|   | R.S.A. 3 - Minerals, Liquids,<br>Vitamins, and Roughage<br>in the Diet |
|   | R.S.A. 4 - Misinformation Con-<br>cerning Food                         |
|   | R.S.A. 5 - The Nutrients - What<br>foods are made of                   |

Job 4 - Plan, Prepare and Serve a Simple Breakfast

- |   |  |
|---|--|
| P.S. 1 - How to Plan a<br>Breakfast Menu              | R.S.A. 1 - Breakfast Foods                 |
| P.S. 2 - How to Buy Breakfast<br>Foods                | R.S.A. 2 - Breakfast, an<br>Important Meal |
| P.S. 3 - How to prepare Break-<br>fast Trays          |  |
| P.S. 4 - How to Prepare and Serve<br>Fruit            |  |
| P.S. 5 - How to Prepare and Serve<br>Cereal           |  |
| P.S. 6 - How to Prepare Beverages                     |  |
| P.S. 7 - How to Prepare and Serve<br>Toast            |  |
| P.S. 8 - How to Prepare and Serve<br>Eggs             |  |
| P.S. 9 - How to Arrange and Serve<br>a Breakfast Tray |  |

Job 5 - How to Plan, Buy and Serve

- |   |  |
|---|--|
| P.S. 1 - How to Plan Daily<br>Menus   | R.S.A. 1 - Principles of Planning<br>Menus     |
| P.S. 2 - How to Buy Food  | R.S.A. 2 - Managing the Budget                 |
| P.S. 3 - How to Make a Study<br>of The Comparative<br>Cost of Food - Field<br>Trip (Optional) | R.S.A. 3 - Principles of Good<br>Table Service |
| P.S. 4 - How to Serve Meals -<br>Family Style   |  |

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Course Outline (Continued)

BOOK II (Continued)

Job 6 - Plan, Prepare and Serve a Lunch

- |  |  |
|--|--|
| P.S. 1 - How to Plan Lunch                     | R.S.A. 1 - Lunch Planning                                  |
| P.S. 2 - How to Prepare Salads                 | R.S.A. 2 - Salads, Their Value and Preparation             |
| P.S. 3 - How to Prepare and Serve Quick Breads | R.S.A. 3 - Principles of Preparing and Serving Quick Bread |
| P.S. 4 - How to Prepare Cheese Dishes          | R.S.A. 4 - Principles of Cheese Cookery                    |
| P.S. 5 - How to Prepare Nutritious Desserts    | R.S.A. 5 - Nutritious Desserts                             |
| P.S. 6 - How to Serve Lunch Family Style       | R.S.A. 6 - Inexpensive Meats and Meat Substitutes          |

Job 7 - Plan, Prepare and Serve Dinner Dishes

- |   |  |
|---|--|
| P.S. 1 - How to Plan, Prepare and Serve Dinner Dishes | R.S.A. 1 - Planning and Serving Dinner Dishes                          |
| P.S. 2 - How to Broil Meat                            | R.S.A. 2 - Principles of Selecting and Cooking Meat, Fish, and Poultry |
| P.S. 3 - How to Prepare Vegetables                    | R.S.A. 3 - Principles of Vegetable Cookery                             |
| P.S. 4 - How to Prepare White Sauce                   | R.S.A. 4 - Types of Cakes  |
| P.S. 5 - How to Prepare a Sponge Cake                 |  |

Job 8 - The Selection of Full, Light, Soft and Liquid Diets

- R.S.A. 1 - The Selection in Full, Light, Soft, and Liquid Diets

Job 9 - Prepare Foods Included in Liquid Diets

- |  |  |
|--|--|
| P.S. 1 - How to Prepare Cream Soup--Tomato     | R.S.A. 1 - Foods Included in Liquid Diet |
| P.S. 2 - How to Prepare Beef Tea               |  |
| P.S. 3 - How to Use Dried Milk                 |  |
| P.S. 4 - How to Prepare High Protein Beverages |  |
| P.S. 5 - How to Prepare High Caloric Beverages |  |

PRACTICAL NURSE EDUCATION  
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Course Outline (Continued)

BOOK II (Continued)

Job 10 - Diets in Diseases of the Digestive System

- |  |   |
|--|---|
| P.S. 1 - How to Plan Menus-<br>and Prepare Foods<br>for Bland Diets                                      | R.S.A. 1 - Diet in the Diseases<br>of the Digestive<br>System |
| P.S. 2 - How to Plan Menus and<br>Prepare Foods for a<br>Low Residue Diet                                |   |
| P.S. 3 - How to Plan Menus and<br>Prepare Foods for Low<br>Fat Diets                                     |   |
| P.S. 4 - How to Plan Menus for<br>Different Types of<br>Constipation - Atonic<br>- Spastic - Obstructive |   |
| P.S. 5 - How to Plan Food For<br>the Patient with<br>Diarrhea or Colitis                                 |   |

Job 11 - Diets for Metabolism Disturbances

- |  |   |
|--|---|
| P.S. 1 - How to Use the<br>Food Exchange List<br>in Preparing a<br>Diabetic Diet | R.S.A. 1 - Principles of Diabetic<br>Treatment by Diet  |
| P.S. 2 - How to Make Menus<br>From a Given Diet<br>Pattern                       | R.S.A. 2 - Principles of Diet in<br>Other Metabolic<br>Disturbances                           |
|  | 1. Hyperthyroidism<br>(a) Hypothyroidism  |
|  | 2. Gout   |
|  | 3. Hypoglycemia<br>(a) Hyperinsulinism<br>(b) Fasting<br>hypoglycemia<br>Addisons<br>Diseases |
|  | 4. Tetany   |

Job 12 - Discuss the Problems of Weight

- |  |  |
|--|--|
| P.S. 1 - How to Plan, Prepare<br>and Serve Menus for<br>the Obese        | R.S.A. 1 - The Relation of<br>Obesity to Health<br>and Disease     |
| P.S. 2 - How to Plan, Prepare<br>and Serve Menu's for<br>the Underweight | R.S.A. 2 - The Relation of<br>Underweight to<br>Health and Disease |



Course Outline (Continued)

BOOK II (Continued)

Job 13 - Diets for Circulatory Diseases

- |   |                                  |
|---|----------------------------------|
| P.S. 1 - How to Select and Plan Diets Low in Sodium | R.S.A. 1 - Low Sodium Diets      |
| P.S. 2 - Plan and Prepare Diets in Anemia           | R.S.A. 2 - Diet in Anemia        |
| P.S. 3 - Plan and Prepare Low Cholesterol Diet      | R.S.A. 3 - Low Cholesterol Diets |

Job 14 - Select and Plan Diets for Some Acute and Chronic Diseases

- |  |  |
|--|--|
| P.S. 1 - How to Plan a Day's Intake for Tuberculosis Patient           | R.S.A. 1 - Special Feeding Problems Due to Physiological and Psychological Changes |
| P.S. 2 - How to Plan a Days Intake for Patient With Cancer             | R.S.A. 2 - Special Dietary Needs in Cancer   |
| P.S. 3 - How to Plan a Days Intake for a Patient with Febrile Diseases | R.S.A. 3 - Special Dietary Needs in Febrile Diseases                               |
|  | R.S.A. 4 - Special Dietary Needs in Tuberculosis                                   |

Job 15 - Meeting the Food Needs During Pregnancy and Lactation

- |  |  |
|--|--|
| P.S. 1 - How to Select a Day's Diet for Pregnant Woman | R.S.A. 1 - Food Needs During Pregnancy     |
| P.S. 2 - How to Select a Days Food for Lactating Women | R.S.A. 2 - The Food Needs During Lactation |

Job 16 - Meeting the Food Needs of the Infant

- |  |   |
|--|---|
| P.S. 1 - How to Make a Table for the Introduction of New Foods. Make a Table Showing the Increasing Quantity of Food as Baby Grows | R.S.A. 1 - Meeting the Food Needs of the Infant |
|--|---|

Job 17 - Meeting the Food Needs of Children of Various Age Groups

- |   |  |
|---|--|
| P.S. 1 - How to Plan a Day's Meals for a 2 Year Old Boy, 6 year old Boy, and a 14 year old Girl (Mother and Father) | R.S.A. 1 - Food Need of Pre-School and School Age Children and Adolescents |
|---|--|

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Course Outline (Continued)

BOOK II (Continued)

Job 18 - Meeting Food Needs During the Golden Years

P.S. 1 - How to Plan Good  
Nutrition for the  
Geriatric Patient

R.S.A. 1 - The Food and Social  
Needs for the Golden  
Years

Job 19 - How to Plan Menus for A Patient with an Allergy

P.S. 1 - How to Plan Menus  
for a Patient with  
an Allergy

R.S.A. 1 - Allergies and Skin  
Disturbances

Job 20 - Food Habits for Various Religious and Racial Groups

R.S.A. 1 - Food Habits of  
Various Religious  
and Racial Groups

BOOK III

Suggested Content for Classes During Clinical Experience

Introduction

Suggested Outline for Planned Clinical Instruction

Medical and Surgical Nursing

The Respiratory System  
The Endocrine System  
The Digestive System  
The Circulatory System  
The Eyes  
The Ears

Geriatric Nursing

Communicable Disease Nursing

Poliomyelitis Nursing

Orthopedic Nursing

Urological Nursing

Gynecological Nursing

Course Outline (Continued)

BOOK III (Continued)

Introduction to Psychiatric Nursing

Obstetrical Nursing and Care of the Newborn

Pediatric Nursing

Course Plan for Hospital Dietary Training for Student  
Practical Nurses

RELATED SCIENCE OF PRACTICAL  
PHYSICS  
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The Related Science of Practical Physics Course was published in 1960 and is available in bound form. It is composed of twenty-nine experiments and study units. The reference for the Related Science of Practical Physics Course is listed below.

Title	Source
Dull, Metcalfe, and Brooks MODERN PHYSICS	Holt, Rinehart and Winston, Inc. 383 Madison Ave. New York 17, New York

A detailed outline of the Related Science of Practical Physics Course follows:

EXPERIMENTS IN PHYSICS FOR INDUSTRIAL TECHNICIANS

Experiment No.

- I. Weights and Measures
- II. Simple Machines: Levers and Pulleys
- III. Work, Power, and Friction
- IV. Pressure in Liquids
- V. Pressure of Air
- \*VI. Liquids and Gases in Motion
- VII. Elasticity and Strength of Materials  
Surface Tension
- VIII. Forces Acting Through a Point
- IX. Accelerated Motion
- X. The Laws of Motion
- XI. Potential and Kinetic Energy
- XII. Heat and Expansion
- XIII. Transmission of Heat
- XIV. Steam and Gas Engines

\*Denotes Study Unit.

RELATED SCIENCE OF PRACTICAL  
PHYSICS  
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Course Outline (Continued)

- XV. Magnetism
- XVI. Electricity at Rest  
(Static Electricity)
- XVII. Electric Currents
- XVIII. Electric Circuits
- XIX. Magnetic and Chemical Effects of Electric Current
- \*XX. Electric Power, Heating and Lighting
- XXI. Electric Generators and Motors
- XXII. Induction Coils and Transformers
- XXIII. Alternating Current

Study Unit No.

- XXIV. Modern Physics
- XXV. Sound Waves
- XXVI. Musical Sounds
- XXVII. Lenses and Optical Instruments
- XXVIII. Spectra and Color
- XXIX. Cathode and X-Rays, Radioactivity

\*Denotes Study Unit

RADIO-TELEVISION-ELECTRONICS  
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The Radio-Television-Electronics Course was published in 1953, revised in 1959 and 1962, and again in 1963. It is available in book form for the instructors and in loose form for distribution to students.

Related Study Assignments, Question and Answer Sheets and Jobs

Book I - Units 1 - 10  
Book II - Units 11 - 17  
Book III - Unit 18  
Book IV - Unit 19  
Book V - Unit 19

Test Books

Book I - Units 1 - 10  
Book II - Units 11 - 17  
Book III - Unit 18  
Book IV - Unit 19

Answer Book

Complete for all tests

The following instructor's aids are available:

Individual Folder Type Progress Chart

The references for the Radio-Television Course are listed below.

Title	Source
Watson, Welch, and Eby UNDERSTANDING RADIO	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Marcus, Abraham RADIO SERVICING	Prentice-Hall Englewood Cliffs, New Jersey
Oldfield, R. L. RADIO, TELEVISION AND BASIC ELECTRONICS	American Technical Society 848 East 58th Street Chicago 37, Illinois
Marcus and Levy ELEMENTS OF RADIO SERVICING	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
RADIO HANDBOOK	Editors and Engineers, Ltd. Summerland, California
THE RADIO AMATEUR'S HANDBOOK BY ARRL	American Radio Relay League 225 Main Street Newington, Connecticut, 06111

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References (Continued)

Title	Source
Ruiter, Jacob, Jr. MODERN OSCILLOSCOPES AND THEIR USES	Holt, Rinehart and Winston, Inc. 383 Madison Avenue New York 17, New York
Kiver TRANSISTOR IN RADIO AND TELEVISION	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Grob, Bernard BASIC TELEVISION	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Swiggett, Robert L. INTRODUCTION TO PRINTED CIRCUITS, No. 185	John F. Rider Publisher, Inc. 116 West 14th Street New York 11, New York
The A.R.R.L. ANTENNA BOOK	American Radio Relay League 38 La Salle Road West Hartford 7, Connecticut
Newitt, John H. HIGH FIDELITY TECHNIQUES	Holt, Rinehart and Winston, Inc. 383 Madison Avenue New York 17, New York
INVERSE FEEDBACK Electronic Technology Series No. 166-15	John F. Rider Publisher, Inc. 116 West 14th Street New York 11, New York
Rabinoff and Wolbrecht PRINCIPLES OF TELEVISION SERVICING	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Buchsbaum, W. H. COLOR TV SERVICING	Prentice-Hall Englewood Cliffs, New Jersey
Oliphant and Ray COLOR TV	Howard W. Sams & Co., Inc. 1720 East 38th Street Indianapolis 6, Indiana
RETMA FUNDAMENTALS OF COLOR TV	John F. Rider Publisher, Inc. 116 West 14th Street New York 11, New York
MANUFACTURER'S SERVICE NOTES	Howard W. Sams & Co., Inc. 1720 East 38th Street Indianapolis 6, Indiana



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References (Continued)

Title

Source

TROUBLESHOOTER'S MANUALS

John F. Rider Publisher, Inc.  
116 West 14th Street  
New York 11, New York

RCA COLOR TV PICT-O-GUIDE

RCA, Electron Tube Division  
Harrison, New Jersey

Darr, Jack  
TWO-WAY MOBILE RADIO MAINTENANCE

Howard W. Sams & Co., Inc.  
1720 East 38th Street  
Indianapolis 6, Indiana

Noll, Edward M.  
MODERN COMMUNICATIONS COURSE  
Vols. 1, 2, and 3

Howard W. Sams & Co., Inc.  
1720 East 38th Street  
Indianapolis 6, Indiana

Shrader, Robert L.  
ELECTRONIC COMMUNICATION

McGraw-Hill Book Co., Inc.  
330 West 42nd Street  
New York 36, New York

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A detailed outline of the Radio-Television-Electronics Course follows.

Unit I - Construction Fundamentals

- R.S.A. 1 - Soldering and Splicing
- Job 1A - Solder Connections and Splice Wire
- Job 1B - Disconnect Soldered Connections
- R.S.A. 2 - Learn Use and Care of Hand Tools
- Job 2A - Learn Use and Care of Hand Tools
- Job 2B - Use Tools

Unit II - Magnetism

- R.S.A. 1 - Study Permanent Magnets and Magnetic Fields
- Job 1 - Study and Plot Magnetic Lines of Force
- R.S.A. 2 - Study of Electromagnetism
- Job 2 - Produce and Study Electromagnetism
- R.S.A. 3 - Study Characteristics of an Electromagnet
- Job 3 - Make an Electromagnet and Study its Characteristics

Unit III - Principles of Electricity

- R.S.A. 1 - Learn Use of Radio Symbols
- Job 1 - Learn Use of Radio Symbols
- R.S.A. 2 - Identification of Electronic Components
- Job 2 - Identification of Electronic Components
- R.S.A. 3 - Resistor Color Code
- Job 3 - Resistor Color Code
- R.S.A. 4 - Learn How Electrical Energy is Produced
- R.S.A. 5 - Learn How Electrical Energy is Measured
- Job 5 - Learn How to Measure Electrical Energy
- R.S.A. 6 - Study the Laws of Electrical Charges
- Job 6 - Study and Prove Laws of Electrical Charges
- R.S.A. 7 - Study Electron Movement

Unit IV - Ohm's Law

- R.S.A. 1 - Use Ohm's Law in Series Circuit
- Job 1 - Use Ohm's Law in Series Circuit
- R.S.A. 2 - Use Ohm's Law in Parallel Circuit
- Job 2 - Use Ohm's Law in Parallel Circuit
- R.S.A. 3 - Use Ohm's Law in Series-Parallel Circuit
- Job 3 - Use Ohm's Law in Series-Parallel Circuit
- R.S.A. 4 - Construct a Multirange Voltmeter
- Job 4 - Construct a Multirange Voltmeter
- R.S.A. 5A - Study Milliammeters
- R.S.A. 5B - Construct an Ohmmeter
- Job 5 - Construct an Ohmmeter
- Job 5A - How to Test Resistors

Course Outline (Continued)

Unit V - Inductance

- R.S.A. 1A - Study Induced Voltages
- R.S.A. 1B - Alternating and Direct Currents
- Job 1 - Produce and Study Induced Voltages
- R.S.A. 2 - Phase Relationship of Voltage and Current in an Inductor or Coil
- Job 2 - Show Phase Relationship of Voltage and Current in an Inductor or Coil
- R.S.A. 3 - Study A. C. Measuring Instruments
- Job 3 - Determine Impedance and Inductance of a Coil

Unit VI - Capacitance

- R.S.A. 1 - Study Color Code as Applied to Capacitors
- Job 1 - Identify Capacitors by Color Code
- R.S.A. 2 - Study the Capacitance or Condenser Tester
- Job 2 - Use Capacitor Tester
- R.S.A. 3 - Study of Capacitance
- Job 3 - Measure and Calculate Condenser Values
- R.S.A. 4 - Capacitance in A. C.
- Job 4 - Study Effect of A.C. and D.C. on Condensers

Unit VII - Time Constant and Resonance

- R.S.A. 1 - Capacitors and Time Constants
- Job 1 - Determine the Time Constant of RC Circuit
- R.S.A. 2A - Time Constants of LR Circuits
- R.S.A. 2B - Resonance
- Job 2A - Determine Resonant Frequency of RCL Series Circuit
- Job 2B - Determine Resonant Frequency of RCL Parallel Circuit

Unit VIII - Vacuum Tubes

- R.S.A. 1 - Study Electron Emission in Vacuum Tubes
- Job 1 - Study Electron Emission in Diode Vacuum Tube
- R.S.A. 2 - Study Electrons in Cathode Ray Tube
- Job 2 - Study Electrons in Cathode Ray Tube
- R.S.A. 3A - Study Electron Action in Diode Tube
- R.S.A. 3B - Study Diode Tube Rectifier
- Job 3 - Build and Study a Vacuum Tube Rectifier
- R.S.A. 4 - Study Rectifier Filters
- Job 4 - Construct Filter for Rectifier
- R.S.A. 5 - A.C. Power Supply for AC-DC Portable
- Job 5 - Build an A.C. Power Supply for a 3-Way Portable Radio
- R.S.A. 6 - Study the Diode Tube as a Detector
- Job 6 - Diode Detector
- R.S.A. 7 - Study the Triode Tube
- Job 7 - Induced Voltage by the Current Change in a Vacuum Tube

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Course Outline (Continued)

Unit VIII -Vacuum Tubes (Cont'd)

- R.S.A. 8 - Study A.C. Triode Tube
- Job 8 - Study Characteristics of Triode Tube
- R.S.A. 9 - Methods of Obtaining Grid Bias
- R.S.A. 10 - Study the Tetrode and Pentode Tubes
- Job 10 - Determine Characteristics of Pentode Tube
- R.S.A. 11 - Study the Vacuum Tube Voltmeter
- Job 11 - Compare Voltmeter and Vacuum Tube Voltmeter
- R.S.A. 12 - Tube Testers
- Job 12 - Test Tubes

Unit IX - Amplification

- R.S.A. 1 - Class A Amplifier
- Job 1 - Build and Study a Triode Amplifier
- R.S.A. 2 - Class B Amplifier
- Job 2 - Build or Study a Class B Amplifier
- R.S.A. 3 - Class C Amplifier
- Job 3 - Class C Amplifier
- R.S.A. 4 - Coupling to the Push-Pull Amplifier Grids
- Job 4 - Coupling to Push-Pull Amplifier Grids
- R.S.A. 5 - Direct Coupled Amplifiers
- Job 5 - Direct Coupled Amplifiers

Unit X - Transistor

- R.S.A. 1 - Semiconductor Theory
- Job 1 - Testing Diodes in Transistors
- R.S.A. 2 - Junction Transistors NPN
- Job 2 - Test for Reverse Current in Collector to Base Circuit
- R.S.A. 3 - Junction Transistors PNP
- Job 3 - Transistor Dynamic Gain
- R.S.A. 4 - Point Contact Transistor
- Job 4 - Voltage Relationship Between Elements
- R.S.A. 5 - Types of Transistors
- Job 5 - Voltage Distribution With Open Base Circuit
- R.S.A. 6 - Transistor Amplifiers
- Job 6 - Transistor Static Gain
- R.S.A. 7 - Servicing Transistor Circuits
- Job 7 - Transistor Amplifier
- R.S.A. 8 - Test Equipment for Transistor Circuits
- Job 8 - Test Equipment
- Job 8A - How to Test Transistors

Unit XI - Oscillation

- R.S.A. 1 - Study Oscillation
- Job 1 - Build a Hartley Oscillator
- R.S.A. 2 - Study Vacuum Tube Oscillators
- Job 2A - Build a Crystal Oscillator

Course Outline (Continued)

Unit XI - Oscillation (Cont'd)

- Job 2B - Study and Build a Modified Colpitts (Clapp) Oscillator Circuit
- R.S.A. 3 - Study UHF Oscillators
- Job 3 - Build a UHF Oscillator With Linear Tank
- R.S.A. 4 - Study Multivibrators
- Job 4 - Build and Study Multivibrator Circuit
- R.S.A. 5 - Transistor Oscillators
- Job 5 - Transistor Oscillator

Unit XII - Radio Receivers

- R.S.A. 1 - Study R. F. Detectors
- Job 1 - Build and Study R.F. Detector Circuits
- R.S.A. 2 - Study R.F. Amplifiers
- Job 2 - Build and Operate a R.F. Amplifier
- R.S.A. 3 - Study the Superheterodyne Receiver
- Job 3 - Build and Study a 5 Tube Superheterodyne Receiver
- R.S.A. 4 - Study Automatic Volume Control
- Job 4 - Determine Values and Use of A.V.C. Voltage
- R.S.A. 5A - Study Frequency Modulation
- R.S.A. 5B - Study Receiver Alignment
- Job 5A - Align a Superheterodyne Receiver
- Job 5B - Align a Superheterodyne Receiver Using an Output Meter
- Job 5C - Align a Superheterodyne Receiver Using a V.T.V.M. as an Output Indicator
- R.S.A. 6 - Study a Three-Way Portable Radio Receiver
- Job 6 - Install a Replacement Oscillator Coil and Align Receiver
- R.S.A. 7 - Transistor Circuits in Radio
- Job 7 - Signal Tracing and Gain Measurement
- R.S.A. 8 - Troubleshooting Transistor Radios
- Job 8 - Troubleshooting in Transistor Receivers
- R.S.A. 9 - Servicing Transistor Radios
- Job 9 - Signal Tracing Using Tuned Probe
- R.S.A. 10 - Alignment of Transistor Radios
- Job 10 - Alignment of Transistor Radio

Unit XIII - Radio Troubleshooting

- R.S.A. 1 - Study Methods of Signal Tracing
- Job 1 - Use Signal Generator, Signal Tracer and the Oscilloscope in Signal Tracing
- R.S.A. 2 - Printed Circuits and Etched Wiring
- Job 2 - Power Supply
- Job 3 - The I. F. Stage
- Job 4 - The Local Oscillator
- Job 5 - The Radio Frequency Amplifier Stage
- Job 6 - How to Replace an Oscillator Coil in a Receiver With a General Replacement Type

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Course Outline (Continued)

Unit XIV - Radio Transmitters and Transmission

- R.S.A. 1 - Study R. F. Power Amplifier
- Job 1 - Build Oscillator and R. F. Amplifier
- R.S.A. 2A - Study Neutralization of Triode R. F. Amplifier
- R.S.A. 2B - Study the Frequency Doubler
- Job 2 - Operate a Frequency Doubler
- R.S.A. 3A - Study Push-Pull R. F. Amplifiers
- R.S.A. 3B - Study Modulation Methods
- Job 3 - Build and Operate a Plate Modulator
- R.S.A. 4A - Study F. M. Transmission
- R.S.A. 4B - Study Antennas
- R.S.A. 4C - Theory of Wave Propagation
- Job 4 - Parasitic Elements
- R.S.A. 5 - Antennas for UHF and VHF
- Job 5 - Demonstrate Standing Waves on Transmission Lines
- Job 6 - Line of Sight Theory Demonstration
- Job 7 - Plot Field Strength of a Vertical Antenna

Unit XV - Hi-Fidelity

- R.S.A. 1 - High Fidelity Systems
- Job 1 - Impedance Matching
- R.S.A. 2A - Loud Speakers
- R.S.A. 2B - High Fidelity Speaker Enclosures
- R.S.A. 2C - Electrical Cross-over Net Works
- Job 2 - Calculation and Design of Negative Feedback Network
- R.S.A. 3A - Records and Record Players
- R.S.A. 3B - Tape Recording and Playback
- Job 3 - Tape Recording
- R.S.A. 4A - The Photo Electric Cell
- R.S.A. 4B - Sound Information on Film
- R.S.A. 4C - Methods of Obtaining Power of the Exciter Lamp in Sound-on-film Reproduction
- Job 4 - Motion Picture Sound

Unit XVI - Advanced Test Equipment

- R.S.A. 1 - Study the Oscilloscope
- Job 1 - Learn Use of the Oscilloscope
- R.S.A. 2 - Study Sweep and Marker Generators
- Job 2 - Learn Use of Sweep and Marker Generators
- R.S.A. 3 - Study the Cross Hatch Generator
- Job 3 - Learn Use of the Cross Hatch Generator
- R.S.A. 4 - Study Voltage Calibrator
- Job 4 - Learn Use of Voltage Calibrator
- R.S.A. 5 - Frequency Standards and Sub-Standards
- Job 5 - Learn Use of Frequency Standard
- R.S.A. 6 - General Application of Test Equipment
- Job 6 - Test Probes



Course Outline (Continued)

Unit XVII - Black and White Television

- R.S.A. 1 - Study the Television System
- Job 1 - Receiver Familiarization
- R.S.A. 2 - Study Picture Tubes
- Job 2 - Observe the Television Signal
- R.S.A. 3 - Study TV Receiver Block Diagrams
- Job 3 - Receiver Block Diagrams
- R.S.A. 4 - Study Sound I.F. Stages and Detector Types
- Job 4A - Align TV Sound I.F. Stages
- Job 4B - Troubleshooting Sound Section Circuits
- R.S.A. 5 - Study Video I.F. Amplifiers
- Job 5 - Build and Align a Video I.F. Strip
- R.S.A. 6 - Study Video I.F. Alignment
- Job 6 - Troubleshooting Video Section Circuits
- R.S.A. 7 - Study TV RF Tuners
- Job 7A - Check Front End Response of TV Set
- Job 7B - Front End Familiarization
- R.S.A. 8 - Study TV Tuner Alignment
- Job 8 - Align a TV Tuner
- R.S.A. 9 - Study Second Detectors and Video Amplifiers
- Job 9 - Build and Test a Video Amplifier
- R.S.A. 10 - Study TV Synchronizing Circuits
- Job 10 - Build and Test a TV Sync Circuit
- R.S.A. 11A - Study a Noise Immune Sync Separator
- R.S.A. 11B - Study TV Sweep Circuits
- Job 11A - Build and Test a TV Blocking Oscillator
- Job 11B - Troubleshooting Horizontal Sweep Circuits
- Job 11C - Troubleshooting Vertical Sweep Circuits
- R.S.A. 12 - Study TV Power Supplies
- Job 12 - Horizontal Deflection Circuit
- R.S.A. 13 - Study AFC-Sync Circuits
- Job 13A - Observe AFC Sync Circuit Characteristics
- Job 13B - Troubleshooting Sync Circuits
- R.S.A. 14 - Study AGC Circuits
- Job 14 - Troubleshooting AGC Circuits
- R.S.A. 15 - How to Install a Replacement Flyback Transformer
- Job 15 - Install and Test a Flyback Transformer
- R.S.A. 16 - Study TV Troubleshooting
- Job 16 - Troubleshoot a TV Receiver
- R.S.A. 17 - Transistor Circuits in Television
- Job 17 - Checking Video Amplifier
- R.S.A. 18 - Servicing Transistor Television
- Job 18 - Troubleshooting Transistor Television
- Job 19 - Trouble Shoot a TV Receiver
- Job 20 - Trouble Shoot a TV Receiver
- Job 21 - Trouble Shoot a TV Receiver
- Job 22 - Trouble Shoot a TV Receiver
- Job 23 - Trouble Shoot a TV Receiver
- Job 24 - Trouble Shoot a TV Receiver
- Job 25 - Trouble Shoot a TV Receiver



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Course Outline (Continued)

Unit XVIII - Color Television

Part I

- R.S.A. 1 - Compatible Color TV System
- R.S.A. 2 - An Introduction to the Basic Color TV System
- R.S.A. 3 - Color Standards
- R.S.A. 4 - The Color Spectrum
- R.S.A. 5 - Wave Lengths of Different Hues
- R.S.A. 6 - Color Mixing to Produce a Desired Hue
- R.S.A. 7 - Some Characteristics of Vision
- R.S.A. 8 - The Standard Color Chart

Part II

- R.S.A. 1 - A General Discussion of the Color Standards
- R.S.A. 2 - Vectors Applied to Analysis of Two-Phase Modulation
- R.S.A. 3 - The Color Sub-Carrier
- R.S.A. 4 - Spectrum Analysis of a Conventional Television Signal
- R.S.A. 5 - Frequency Interleaving
- R.S.A. 6 - I and Q Signals
- R.S.A. 7 - Circuitry Added to a Television Receiver to Produce Color
- R.S.A. 8 - Block Diagrams of a Color Receiver

Part III

- R.S.A. 1 - The Tuner of Front-End Circuits
- R.S.A. 2 - The Video Intermediate Frequency Stages
- R.S.A. 3 - The Video Amplifier
- Job 1 - Video 4.5 mc. Trap Adjustment
- R.S.A. 4 - The Audio System
- R.S.A. 5 - The Chroma Amplifier or Band-Pass Amplifier
- R.S.A. 6 - Phase Detectors
- R.S.A. 7 - Color Killer Circuits
- R.S.A. 8 - I and Q Demodulators or Synchronous Detectors
- R.S.A. 9 - The 3.58 mc. Reference Oscillator
- R.S.A. 10 - Color Synchronization
- R.S.A. 11 - Sound Intermediate Frequency and Quadrature Detector
- Job 2 - Sound I. F. Alignment
- R.S.A. 12 - Color Matrixing
- R.S.A. 13 - Reproduction of Color

Part IV

- R.S.A. 1 - Principles
- R.S.A. 2 - Adjustments
- R.S.A. 3 - Handling
- R.S.A. 4 - Purity
- R.S.A. 5 - Static Convergence
- R.S.A. 6 - Dynamic Convergence
- R.S.A. 7 - Convergence Circuitry
- Job 1 - Dynamic Convergence Adjustments Horizontal Convergence

Course Outline (Continued)

Unit XVIII - Color Television

Part IV (Cont'd)

- Job 2 - Dynamic Convergence Adjustments Vertical Convergence
- R.S.A. 8 - Receiver Adjustments
- Job 3 - Shop Project
- Job 4 - AGC Control and Noise Threshold Adjustment

Part V

- R.S.A. 1 - Burst Amplifier and Crystal Oscillator Alignment
- R.S.A. 2 - Quadrature and Demodulator Alignment
- R.S.A. 3 - Chroma Channel Alignment
- Job 1 - First Video Amplifier and Band Pass Amplifier Alignment
- R.S.A. 4 - Video Intermediate Frequency Alignment
- Job 2 - Picture I.F. Transformer Adjustments
- Job 3 - Sweep Alignment of Picture I.F.
- R.S.A. 5 - Sound Intermediate Frequency Alignment
- R.S.A. 6 - Tuner Alignment
- Job 4 - Antenna Matching Unit Alignment
- Job 5 - Tuner Alignment
- Job 6 - UHF Alignment
- R.S.A. 7 - Test Equipment

Part VI

- R.S.A. 1 - Voltage Regulation
- Job 1 - Horizontal Oscillator Alignment
- Job 2 - High Voltage Adjustment
- R.S.A. 2 - Obtaining the Voltage for the Convergence Section
- R.S.A. 3 - The Deflection Yoke
- R.S.A. 4 - The Convergence Yoke
- Job 3 - Preliminary Convergence and Color Purity Adjustments

Part VII

- R.S.A. 1 - Color Control
- R.S.A. 2 - Hue Control
- Job 1 - Color AFC Alignment
- R.S.A. 3 - The Contrast Control--The Brightness Control
- R.S.A. 4 - The Fine Tuning Control

Part VIII

- R.S.A. 1 - Phase and Matrix
- R.S.A. 2 - Purity
- R.S.A. 3 - Convergence
- Job 1 - Convergence Coils
- R.S.A. 4 - Black and White Adjustments
- Job 2 - Black and White Adjustments

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Course Outline (Continued)

Unit XVIII - Color Television

Part IX

- R.S.A. 1 - Checking Tuner, Video IF and Video Amplifier
- R.S.A. 2 - Signal Tracing in the Chroma Section
- Job 1 - Oscilloscope Waveforms

Part X

- R.S.A. 1 - Dot-Bar Generator
- R.S.A. 2 - Color Bar Generator
- R.S.A. 3 - The Color Stripe Signals for Testing Receivers
- R.S.A. 4 - R.F. - I.F. Alignment Equipment
- R.S.A. 5 - Video Alignment Equipment
- R.S.A. 6 - R.F., Demodulator, Low Capacity and High Voltage Probes
- R.S.A. 7 - Oscilloscopes

Part XI

- R.S.A. 1 - Antennas
- R.S.A. 2 - Transmission Lines
- R.S.A. 3 - Receiver Installation
- R.S.A. 4 - Antenna System Installation

Part XII

- R.S.A. 1 - Servicing Hints
- Job 1 - Field Adjustment of Demodulator Phasing
- R.S.A. 2 - Signal Tracing

Unit XIX - Communications

- R.S.A. 1 Modulation Systems
  - Question and Answer Sheet No. 1
  - Question and Answer Sheet No. 2
  - Question and Answer Sheet No. 3
- Job 1 Receiver Familiarization
- R.S.A. 2 Frequency Modulation
  - Question and Answer Sheet No. 4
  - Question and Answer Sheet No. 5
  - Question and Answer Sheet No. 6
  - Question and Answer Sheet No. 7
- Job 2 Receiver Voltage and Resistance
- R.S.A. 3 FM Receiver
  - Question and Answer Sheet No. 8
  - Question and Answer Sheet No. 9
  - Question and Answer Sheet No. 10
  - Question and Answer Sheet No. 11
- Job 3 FM Receiver
- R.S.A. 4 R-F Amplifier

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Course Outline (Continued)

Unit XIX - Communications

		Question and Answer Sheet No. 12
		Question and Answer Sheet No. 13
		Question and Answer Sheet No. 14
		Question and Answer Sheet No. 15
Job	4	R-F Amplifier
R.S.A.	5	High Frequency Oscillator-Mixer
		Question and Answer Sheet No. 16
		Question and Answer Sheet No. 17
		Question and Answer Sheet No. 18
		Question and Answer Sheet No. 19
Job	5	High Frequency Oscillator-Mixer
R.S.A.	6	First I-F Amplifiers
		Question and Answer Sheet No. 20
		Question and Answer Sheet No. 21
		Question and Answer Sheet No. 22
		Question and Answer Sheet No. 23
Job	6	First I-F Amplifiers
R.S.A.	7	Second Mixer, Oscillator, and Second I-F Stages
		Question and Answer Sheet No. 24
		Question and Answer Sheet No. 25
		Question and Answer Sheet No. 26
		Question and Answer Sheet No. 27
Job	7	Second Mixer, Oscillator, and I-F Stages
R.S.A.	8	Limiter
		Question and Answer Sheet No. 28
		Question and Answer Sheet No. 29
		Question and Answer Sheet No. 30
		Question and Answer Sheet No. 31
Job	8	Limiters
R.S.A.	9	Discriminator
		Question and Answer Sheet No. 32
		Question and Answer Sheet No. 33
		Question and Answer Sheet No. 34
		Question and Answer Sheet No. 35
Job	9	Discriminator
R.S.A.	10	Audio Circuits and Squelch
		Question and Answer Sheet No. 36
		Question and Answer Sheet No. 37
		Question and Answer Sheet No. 38
		Question and Answer Sheet No. 39
Job	10	Audio and Squelch Circuits
R.S.A.	11	Receiver Specifications
		Question and Answer Sheet No. 40
		Question and Answer Sheet No. 41
		Question and Answer Sheet No. 42
		Question and Answer Sheet No. 43
Job	11	20 DB Quieting Test

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Course Outline (Continued)

Unit XIX - Communications

R.S.A.	12	Receiver Servicing	
		Question and Answer Sheet No.	44
		Question and Answer Sheet No.	45
		Question and Answer Sheet No.	46
		Question and Answer Sheet No.	47
Job	12	Receiver Gain Checks	
Job	12A	"Motrac" Receiver Stage Gain Checks	
R.S.A.	13	Modulation Methods	
		Question and Answer Sheet No.	48
		Question and Answer Sheet No.	49
		Question and Answer Sheet No.	50
		Question and Answer Sheet No.	51
Job	13	Transmitter Familiarization	
Job	13A	Citizens Band Transceiver	
R.S.A.	14	Transmitter Block Diagram	
		Transmitter Block Diagram	
		Question and Answer Sheet No.	52
		Question and Answer Sheet No.	53
		Question and Answer Sheet No.	54
		Question and Answer Sheet No.	55
Job	14	Transmitter Voltage and Resistance	
R.S.A.	15	Oscillator	
		Question and Answer Sheet No.	56
		Question and Answer Sheet No.	57
		Question and Answer Sheet No.	58
		Question and Answer Sheet No.	59
		Question and Answer Sheet No.	60
Job	15	Oscillator	
R.S.A.	16	Phase Modulator	
		Question and Answer Sheet No.	61
		Question and Answer Sheet No.	62
		Question and Answer Sheet No.	63
		Question and Answer Sheet No.	64
		Question and Answer Sheet No.	65
Job	16	Phase Modulator	
R.S.A.	17	Audio Circuits	
		Question and Answer Sheet No.	66
		Question and Answer Sheet No.	67
		Question and Answer Sheet No.	68
		Question and Answer Sheet No.	69
		Question and Answer Sheet No.	70
Job	17	Audio Circuits	
R.S.A.	18	Frequency Multipliers	
Job	18	Frequency Multipliers	
R.S.A.	19	Power Amplifiers	
Job	19	Power Amplifiers	

Course Outline (Continued)

Unit XIX - Communications

R.S.A.	20	Transmitter Servicing
Job	20	Transmitter Servicing
R.S.A.	21	Power Supplies - General
Job	21	Dynamotor Power Supply
R.S.A.	22	Power Supplies - Vibrator and Dynamotor
Job	22	Vibrator Power Supply
R.S.A.	23	Power Supplies - Transistor
Job	23	Transistor Power Supply
R.S.A.	24	Power Supplies - A. C.
Job	24	A. C. Power Supply
R.S.A.	25	Antennas
Job	25	Antennas
R.S.A.	26	Towers and Transmission Lines
Job	26	Tower Installation
R.S.A.	27	Mobile Installation
Job	27	Mobile Installation
R.S.A.	28	Base Station Installation
Job	28	Base Station - Remote Control
Job	28A	Extender Circuit Servicing
R.S.A.	29	Test Equipment
Job	29	F. M. Station Monitor
R.S.A.	30	F. C. C. Tests and Measurements
Job	30	F. C. C. Tests and Measurements
R.S.A.	31	Selective Calling
Job	31	Tone-Coded Systems
R.S.A.	32	Preventive Maintenance
Job	32	Preventive Maintenance
R.S.A.	33	Microwave
Job	33	"Handie-Talkie" FM Radio
R.S.A.	34	Radio Relay Systems
Job	34	Stage Gain Measurement
R.S.A.	35	Trouble Shooting
Job	35	Trouble Shooting
Job	36	Trouble Shooting
Job	37	Trouble Shooting
Job	38	Trouble Shooting
Job	39	Trouble Shooting
Job	40	Trouble Shooting
R.S.A.	36	International Morse Code



REFRIGERATION &  
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The Refrigeration and Air Conditioning Course was published in 1951-52 and revised in 1962. It is available in the following forms:

Book I

Related Study Assignments	Unit I
Jobs	Unit I
Mathematics	Unit I

Book II

Related Study Assignments	Units II & III
Jobs	Units II & III
Mathematics	Units II & III

Book III

Related Study Assignments	Unit IV
Jobs	Unit IV
Mathematics	Unit IV

Book IV

Related Study Assignments	Unit V
Jobs	Unit V
Mathematics	Unit V

Test Book

Book I	Units I, II, & III
Book II	Units IV & V

Answer Book

Complete for tests and math

The following instructor's aids are available:

Class Progress Chart (Pad)  
Individual Folder Type

The references for the Refrigeration & Air Conditioning Course are the following:

Title	Source
ABC'S OF HAND TOOLS	General Motors Corporation General Motors Technical Center Warren, Michigan
IMPERIAL TUBE WORKING HANDBOOK No. 369-B	Imperial Eastman Corporation Imperial Brass Division 6300 West Howard Street Chicago 48, Illinois



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References (Continued)

Title	Source
Olivo and Marsh PRINCIPLES OF REFRIGERATION	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
Althouse and Turnquist MODERN REFRIGERATION AND AIR CONDITIONING	The Goodheart-Willcox Co., Inc., 1322 South Wabash Avenue Chicago 5, Illinois
Anderson, Edwin P. AUDEL'S REFRIGERATION AND AIR CONDITIONING GUIDE	Theo. Audel and Co. 49 West 23rd Street New York 10, New York
IMPERIAL CATALOG No. 80-A	Imperial Eastman Corporation Imperial Brass Division 6300 West Howard Street Chicago 48, Illinois
A TO ZERO OF REFRIGERATION	General Motors Corporation General Motors Technical Center Warren, Michigan
NEW MASTER SERVICE MANUAL No. N-1	Business News Publishing Co. 450 West Fort Street Detroit 26, Michigan
BASIC REFRIGERATION-PRINCIPLES- PRACTICE-OPERATION	Nickerson and Collins Co. 433 Waller Ave. Chicago 44, Illinois
Magnus-Marlott HANDBOOK OF REFRIGERATION AND AIR CONDITIONING	Follett Publishing Co. 1010 W. Washington Blvd. Chicago 7, Illinois
BASIC BENCH-METAL PRACTICE AND PRECISION MEASURING	The Manual Arts Press Peoria, Illinois
HOW TO RUN A LATHE, Vol. 1	South Bend Lathe Works South Bend 22, Indiana
REFRIGERATION PROBLEMS AND THEIR SOLUTIONS, Manuals J-1, J-2, J-3, J-4, and J-5	Business News Publishing Co. 450 W. Fort Street Detroit 26, Michigan

References (Continued)

Title	Source
COPELAMETIC PARTS	Copeland Refrigeration Corp. Sidney, Ohio
COPELAMETIC CONDENSING UNIT AND MOTOR-COMPRESSOR SERVICE MANUAL	Copeland Refrigeration Corp. Sidney, Ohio
NORGE ROLLATOR REFRIGERATION SERVICE OPEN TYPE SYSTEM	Norge Appliance Service Dept. Borg-Warner Corp. Sherman Blvd. Plant Mushegon Heights, Michigan
HANDBOOK OF AUTOMATIC REFRIGERANT CONTROLS	Alco Valve Company 865 Kingland Avenue St. Louis 5, Missouri
Millikan, Robert A. MAGNETISM	American Technical Society 848 East 58th Street Chicago 37, Illinois
Dunlap and McDougal, CURRENT ELECTRICITY	American Technical Society 848 East 58th Street Chicago 37, Illinois
McDougal, Wynne L., SERIES AND PARALLEL CIRCUITS	American Technical Society 848 East 58th Street Chicago 37, Illinois
Richter, H. P. PRACTICAL ELECTRICAL WIRING	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Crouse, William H. ELECTRICAL APPLIANCE SERVICING	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
M-H AIR CONDITIONING CONTROLS (Electric) REFERENCE MANUAL	Minneapolis-Honeywell Regu- lator Company 2747 Fourth Avenue South Minneapolis 8, Minnesota
THE NATIONAL ELECTRICAL CODE	National Board of Fire Underwriters 85 John Street New York 38, New York

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References (Continued)

Title	Source
Rosenberg, Robert ELECTRIC MOTOR REPAIR	Holt, Rinehart and Winston, Inc. 383 Madison Ave. New York 17, New York
Veinott, G. G. FRACTIONAL HORSEPOWER ELECTRIC MOTORS	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
CUTLER-HAMMER REFRIGERATION CONTROL CATALOG	Cutler-Hammer, Inc. Milwaukee 1, Wisconsin
RANCO MANUAL No. 1058 and No. 1244	Ranco, Inc. 601 W. Fifth Avenue Columbus 1, Ohio
Rolf, Oliver K. REBUILDING HERMETIC UNITS	Nickerson and Collins 433-435 North Waller Ave. Chicago 44, Illinois
Lasher and Richards HOW YOU CAN GET A BETTER JOB	American Technical Society 848 East 58th Street Chicago 37, Illinois
PENN INSTALLATION AND SERVICE MANUAL	Penn Controls, Inc. Goshen, Indiana
MASTER SERVICE MANUAL, COMMERCIAL REFRIGERATION, C-1	Business News Publishing Co., 450 W. Fort Street Detroit 26, Michigan
SPORLAN VALVE CO. CATALOG No. 55	Sporlan Valve Company 7525 Sussex Avenue St. Louis 17, Missouri
SAFETY CODE FOR MECHANICAL REFRIGERATION	The American Society of Refrigerating Engineers 234 Fifth Avenue New York 1, New York
Anderson, Edwin P. AUDEL'S PLUMBERS AND STEAM FITTERS GUIDE	Theo. Audel and Company 49 West 23rd Street New York 10, New York
TRANE AIR CONDITIONING MANUAL	The Trane Company, Educational Division LaCrosse, Wisconsin

References (Continued)

Title	Source
AIR CONDITIONING AND REFRIGERATING DATA BOOK, Application Volume	The American Society of Refrigerating Engineers 234 Fifth Avenue New York 1, New York
TRANE REFRIGERATION MANUAL	The Trane Company, Educational Division LaCrosse, Wisconsin
AIR CONDITIONING AND REFRIGERATING DATA BOOK, Design Volume	The American Society of Refrigerating Engineers 234 Fifth Avenue New York 1, New York
AUTOMATIC CONTROL OF HEATING AND AIR CONDITIONING	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
STANDARD REFRIGERATION AND AIR CONDITIONING, QUESTIONS & ANSWERS	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Marsh, R. Warren and Olivo, C. Thomas PRINCIPLES OF REFRIGERATION with INSTRUCTOR'S GUIDE	Delmar Publishers, Inc. Mountainview Ave. Albany 5, New York
COMMERCIAL AND INDUSTRIAL REFRIGERATION	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
LaSalvia, James L. KEY TO AIR CONDITIONING Manuals K-1, K-2, & K-3	Business News Publishing Co. 450 W. Fort Street Detroit 26, Michigan

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A detailed outline of the Refrigeration and Air Conditioning Course follows.

Unit I

- Math 1 - Linear Measurement
- R.S.A. 1 - Hand Tools and How to Use
- Job 1 - Identify Assigned Tools
- Math 2 - Rule Practice
- R.S.A. 2 - Working Copper Tubing
- Job 2 - Cut and Bend Copper Tubing
- Math 3 - Addition of Rule Measurements
- R.S.A. 3 - Fittings
- Job 3 - Check Sizes of Flare, Sweat, and Pipe Fittings
- R.S.A. 4 - Simplified Principles of Refrigeration
- Job 4 - Flare and Connect Copper Tubing
- R.S.A. 5 - How to Solder Connections and Use Halide Leak Detector
- Job 5 - Swedge and Solder Copper Tubing
- Math 4 - Subtraction of Rule Measurements
- Math 5 - Addition of Whole Numbers
- Math 6 - Subtraction of Whole Numbers
- R.S.A. 6 - Service Valves
- Job 6 - Disassemble and Reassemble Service Valves
- R.S.A. 7 - Refrigeration Gauges
- Job 7 - Install and Remove High and Low Pressure Gauges
- R.S.A. 8 - Principles of Refrigeration
- Job 8 - Identify Screws, Bolts, and Nuts
- Math 7 - Reducing Fractions to Lowest Terms
- R.S.A. 9 - Screw, Bolt, and Nut Sizes
- Math 8 - Changing Improper Fractions to Mixed Numbers
- Math 9 - The Micrometer
- R.S.A. 10 - The Lathe
- R.S.A. 11 - Compressors and Compressor Parts
- Job 9 - Disassemble, Clean and Check Compressor
- R.S.A. 12 - Compressor Repairing Precision Work
- Job 10 - Repair Compressor Parts
- Job 11 - Reassemble Compressor
- R.S.A. 13 - Refrigerant Oils
- Job 12 - Service and Test Compressor
- Math 10 - Changing Mixed Numbers to Improper Fractions
- Math 11 - Changing Fractions to Higher Terms
- R.S.A. 14 - Serviceable Hermetic Compressor Part
- Job 13 - Disassemble, Repair and Reassemble A Serviceable Hermetic Compressor
- Math 12 - Least Common Denominators
- Job 14 - Service A Rotary Compressor
- Math 13 - Addition of Fractions
- R.S.A. 15 - Shop Sketching

Course Outline (Continued)

Unit I (Continued)

- R.S.A. 16 - Condensers and Receivers
- Job 15 - Clean A Condenser and A Receiver
- R.S.A. 17 - Shop Sketching, Forming Figures
- Job 16 - Check a Low Side and A High Side Float
- Math 14 - Subtraction of Fractions
- R.S.A. 18 - Expansion Valve Refrigerator System
- Job 17 - Check and Adjust Automatic Expansion Valve
- Math 15 - Multiplication of Fractions
- Job 18 - Check and Adjust Thermostatic Expansion Valve
- R.S.A. 19 - Capillary Tube
- Math 16 - Division of Fractions
- Job 19 - Check Capillary Tube System
- R.S.A. 20 - Evaporators
- Job 20 - Test and Repair Evaporators
- Math 17 - The Decimal System

Unit II

- R.S.A. 1 - Magnetism
- Job 1 - Determine the Polarity of Magnets and the Existence of Magnetic Fields
- R.S.A. 2 - Current Electricity and Electro-Magnetism
- Job 2 - Make an Electromagnet and Study its Characteristics
- R.S.A. 3 - Electric Circuits, Series and Parallel
- Job 3 - Series and Parallel Circuits
- R.S.A. 4 - Operation and Care of Volt, Ampere, Ohm, and Watt Meters
- Job 4 - Taking Meter Readings
- R.S.A. 5 - Ohm's Law
- Job 5 - Ohm's Law
- R.S.A. 6 - Types of Refrigeration and Air Conditioning Controls
- Job 6A - Connect a Combination High Pressure and Low Pressure Control
- Job 6B - Connect a Temperature Control
- Job 6C - Connect 3-Phase Motor Controlled by a Remote Start-Stop Pushbutton
- R.S.A. 7 - Types of Relays
- Job 7 - Connecting Relays
- R.S.A. 8 - Insulation and Current Capacity of Conductors
- Job 8 - Measure Sizes of Wire
- R.S.A. 9 - Electric Motors
- Job 9A - Disassemble, Check, and Reassemble A Split-Phase Motor and A Capacitor Start Motor
- Job 9B - Disassemble, Check, and Reassemble a Three Phase Motor
- Job 9C - Disassemble, Check, and Reassemble R. I. Motor



Course Outline (Continued)

Unit II (Continued)

- R.S.A. 10 - Universal Motors
- Job 10 - Disassemble, Check and Reassemble Universal Motor
- R.S.A. 11 - Construction, Operation and Connections of Capacitors
- Job 11 - Testing Capacitors
- R.S.A. 12 - Capacitor Motors
- Job 12 - Disassemble, Repair and Reassemble A Capacitor-Start Motor

Unit III

- Math 1 - Square and Cubic Measurements and Multiplication of Whole Numbers
- R.S.A. 1 - Practical Theory of Refrigeration
- Math 2 - Division of Whole Numbers
- R.S.A. 2 - Moisture, Air and Foreign Matter
- Job 1 - Refill Small Refrigerant Cylinder
- R.S.A. 3 - Refrigerants
- Job 2 - Check Refrigerant Cylinder Pressure
- R.S.A. 4 - Sealed Unit Refrigerators
- Job 3 - Check Electrical System on Sealed Units
- Job 4 - Make Trouble Shooter Chart Using Manufacturer's Manual
- Job 5 - Check Sealed Unit, Using Chart, and Determine Trouble in A Written Diagnosis
- Job 6 - Check A Sealed Unit System
- Job 7 - Check And Replace Thermostatic Motor Control in Electrical System. Explain Functions and Give Reason For Replacing
- Job 8 - Replace a Defective Cabinet Light Switch in Electrical Circuit and Make Free Hand Sketch of Entire Electrical System
- Job 9 - Check a Sealed Unit For a "Grounded Unit" - "To Housing" - "Between Windings"
- Job 10 - Identify Motor Terminals and Run Sealed Unit With A Starting Cord
- R.S.A. 5 - Absorption Type Refrigerator
- Job 11 - Reverse Rotation on A Sealed Unit
- Job 12 - Open A Sealed Unit and Check Whether or Not It Is Repairable
- Job 13 - Repair A Leaking Motor Terminal On A Sealed Unit
- Job 14 - Check Sealed Unit For Refrigerant Leak, Repair and Recharge Unit - Make Written Diagnosis of Leak and Method of Repair



Course Outline (Continued)

Unit III (Continued)

- Job 15 - Replace A Major Component of a Sealed Unit -  
Give Type Solder and Flux Used
- Job 16 - Dehydrate, Charge and Operate Unit Repaired  
In Job 15
- R.S.A. 6 - Expansion Valve
- Job 17 - Rewire Sealed Unit System
- Math 3 - Making and Reading Line Graphs
- Job 18 - Assemble Unit With A.E.V., Using Reciprocating  
Compressor
- Job 19 - Assemble Unit With A Thermostatic Expansion Valve
- R.S.A. 7 - Capillary Tube Refrigerator Systems
- Job 20 - Assemble Unit With Capillary Tube
- R.S.A. 8 - Domestic Refrigeration Servicing
- R.S.A. 9 - Dual Temperature Refrigerator
- Job 21 - Check and Repair A Combination Home Freezer-  
Refrigerator
- R.S.A. 10 - Personal and Social Problems - Getting and  
Holding a Job
- Job 22 - Check and Repair A Capillary Tube, Open Type  
Refrigerator
- R.S.A. 11 - Home Freezer
- Job 23 - Check and Repair A Home Freezer With Capillary  
Tube Control
- R.S.A. 12 - Cabinets, Cabinet Repairing and Refinishing
- Job 24 - Replace Door Gasket
- Job 25 - Repair or Replace Cabinet Hardware
- Job 26 - Refinish Refrigerator Cabinet

Unit IV

- R.S.A. 1 - Motor Controls
- Job 1 - Adjust Low Pressure Motor Control
- Math 1 - Simple Percentage
- Job 2 - Check and Adjust Thermostatic Motor Control
- Job 3 - Adjust High Pressure Control and A Combination  
Control
- Math 2 - Discount
- R.S.A. 2 - Advanced Refrigeration Fundamentals and  
Commercial Evaporators
- Job 4 - Install Gravity Coil In Reach-In Box Using  
Air-Cooled Condensing Unit
- Job 5 - Replace The Gravity Coil With a Blower-Coil on  
Job No. 4
- Math 3 - Evaporator Capacity
- R.S.A. 3 - Commercial Refrigeration Valves and Controls
- Job 6 - Service Water Regulating Valves

Course Outline (Continued)

Unit IV (Continued)

- R.S.A. 4 - American Standard Safety Code for Mechanical Refrigeration
- Job 7 - Clean (Small) Water Cooled Condenser
- R.S.A. 5 - Pipe Sizes
- Job 8 - Thread and Connect Pipe
- R.S.A. 6 - Condensing Units and Refrigerant Pipes
- Job 9 - Install Gravity Coil in Walk-In Box Using Water-Cooled Condensing Unit
- Math 4 - Compressor Capacity
- Job 10 - Replace the Gravity Coil With a Blower Coil on Job No. 9
- R.S.A. 7 - Multiple Systems
- Job 11 - Install A Complete Multiple Unit (Same temperature)
- Job 12 - Install A Solenoid Valve and Thermostatic Control on Job No. 10.
- R.S.A. 8 - Commercial Refrigeration Systems
- Job 13 - Install A Two-Temperature Valve Job
- Job 14 - Install and/or Operate Hot Gas Defrost on Job
- R.S.A. 9 - Commercial Refrigeration Installation
- Job 15 - Install and Operate Water Defrost
- R.S.A. 9A - Wet and Dry Type Beverage Coolers
- Job 16 - Install or Service a Wet Beverage Cooler
- Job 17 - Install or Service a Dry Beverage Cooler
- Math 5 - Refrigerant Pipe Capacity
- Job 18 - Service a Water Cooler
- Job 19 - Construct and/or Install or Service Small Ice Maker
- R.S.A. 10 - Miscellaneous Refrigeration Equipment
- Job 20 - Construct and/or Install Counter-Flow Condenser
- Job 21 - Install Oil Separator on Unit
- Math 6 - Service Orders
- Job 22 - Construct and/or Install Heat Interchanger
- R.S.A. 11 - Cooling Water
- Job 23 - Construct and/or Install Evaporative Condensers
- Job 24 - Check a Forced Draft Water Tower
- R.S.A. 12 - Evaporative Condensers
- R.S.A. 13 - Commercial Refrigeration - Electrical
- Job 25 - Install and/or Connect Single Phase Motor Using Magnetic Switch
- Job 26 - Install and/or Connect Three Phase Motor Using Magnetic Switch
- Job 27 - Install and/or Connect Three Phase Motor Using Magnetic Switch and Pilot Relay
- R.S.A. 14 - Low Temperature and R-22
- Job 28 - Check Operation of Ice Cream Cabinet
- Job 29 - Construct and/or Check Low Temperature Unit
- Math 7 - Parts and Supply Orders

Course Outline (Continued)

Unit IV (Continued)

- Job 30 - Install and Check a Plate Coil
- R.S.A. 15 - Heat Pumps
- Job 31 - Construct and Operate a Heat Pump
- R.S.A. 16 - Ammonia System
- Job 32 - Design and Sketch An Ammonia System
- R.S.A. 17 - Factors That Affect Commercial Refrigeration
- R.S.A. 18 - Commercial Refrigeration Calculations and Heat Load
- Job 33 - Survey and Calculate a Heat Load
- Math 8 - Job Costs
- R.S.A. 19 - Safety and First Aid for the Refrigeration Service Engineer

Unit V

- R.S.A. 1 - Air Conditioning Equipment
- Job 1 - Install and/or Check Portable Air Conditioning Unit
- R.S.A. 2 - Heat Temperature and Comfort
- Job 2 - Check Installation of Window Unit
- Job 3 - Remove Cabinet From Window Unit Identifying Component Parts and Make a Trouble Shooters Chart on a Room Unit Using Mfgs. Service Manual
- Job 4 - Check and Repair Electrical System on a Room Unit-- Make Repairs if Necessary
- Job 5 - Check Sealed Unit For "Grounded Out" Motor-to-Housing--Between Windings and Identify Motor Terminals as Running, Starting, Common--Give Method Used
- Job 6 - Open a Defective Sealed Unit to Find Cause of Failure--Give Method Used for Repair
- Job 7 - Check and Clean Filter--Replace if Necessary
- Job 8 - Check Condensate and Explain What Use is Made of it By the Condenser and Condenser Fan
- Job 9 - Replace a Major Component Part of a Room A/C Unit--Make Complete Service Report
- Job 10 - Check Air Flow With Anemometer or Velometer
- Job 11 - Install and/or Check Self-Contained Unit
- R.S.A. 3 - Heat Gains, Part I and Part II
- Job 12 - Check Relative Humidity
- R.S.A. 4 - Residential Winter Air Conditioning
- Job 13 - Install or Check Residential Forced Air Heating System
- R.S.A. 5 - Properties of Air
- Job 14 - Install a Complete Remote Air Conditioning Unit
- R.S.A. 6 - The Psychrometric Chart
- Job 15 - Check and Oil Motors on Air Conditioning System

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Course Outline (Continued)

Unit V (Continued)

- R.S.A. 7 - Air Conditioning Calculations, Part I
- Math 1 - Measurement of Angles
- Job 16 - Check or Install and Operate Duct-type Heater  
Coil in Air Conditioning System. Install  
Necessary Controls
- R.S.A. 8 - Ducts and Fans
- Job 17 - Install Modulating Motor System
- Job 18 - Check the Efficiency of Atmospheric Tower as  
Compared to Forced Draft Tower
- Job 19 - Balance a Duct System
- R.S.A. 9 - Air Conditioning Calculations, Part II
- Job 20 - Survey and Calculate a Cooling Load
- R.S.A. 10 - Automotive Air Conditioning and Controls
- Job 21 - Servicing Automotive Air Conditioning Unit

SHEET METAL COURSE  
Trade Preparatory & Apprentice

C Page 1 of 3

The Sheet Metal Course was written in 1958. It is available in the following form.

Related Study Assignment  
Book 1

Test  
Available in loose form

Others

Blueprint Reading and Sketching - Petroleum Industry  
Workers

Successful Soldering by Louie S. Taylor

Student Study Guide in Sheet Metal Work - for apprentices  
on-the-job Trainers  
and other Learners

A detailed outline of the Related Study Assignments follows:

- R.S.A. 1 - Machine Processes - Bar Folder
- R.S.A. 2 - Machine Processes - Hand Brake
- R.S.A. 3 - Machine Processes - Forming Rolls
- R.S.A. 4 - Machine Processes - Squaring Shears
- R.S.A. 5 - Machine Processes - Beading Machine
- R.S.A. 6 - Machine Processes - Crimping Machine
- R.S.A. 7 - Machine Processes - Turning Machine
- R.S.A. 8 - Machine Processes - Burring Machine
- R.S.A. 9 - Machine Processes - Drill Presses
- R.S.A. 10 - Machine Processes - Grinding Wheels
- R.S.A. 11 - Hand Processes - Bench Tools
- R.S.A. 12 - Hand Processes - Patterns
- R.S.A. 13 - Hand Processes - Hand Snips
- R.S.A. 14 - Hand Processes - Forming Stakes
- R.S.A. 15 - Hand Processes - Bending Metal
- R.S.A. 16 - Hand Processes - Files

SHEET METAL COURSE  
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Course Outline (Continued)

- R.S.A. 16 - Hand Processes - Files
- R.S.A. 17 - Hand Processes - Soldering Coppers
- R.S.A. 18 - Hand Processes - Solders and Fluxes
- R.S.A. 19 - Hand Processes - Grooved Seams
- R.S.A. 20 - Hand Processes - Chisels
- R.S.A. 21 - Hand Processes - Stretching and Shrinking
- R.S.A. 22 - Hand Processes - Solid & Hollow Punches
- R.S.A. 23 - Hand Processes - Hand Punches
- R.S.A. 24 - Hand Processes - Drills
- R.S.A. 25 - Hand Processes - Rivets & Riveting
- R.S.A. 26 - Hand Processes - The Hack Saw
- R.S.A. 27 - Hand Processes - Wired Edges
- R.S.A. 28 - Hand Processes - Single and Double Seams
- R.S.A. 29 - Hand Processes - Pittsburgh Lock
- R.S.A. 30 - Test - Gable Molding With Raked Profile
- R.S.A. 31 - Test - Miter - Different Profiles
- R.S.A. 32 - See Instructor
- R.S.A. 33 - Test - Cone & Frustum
- R.S.A. 34 - See Instructor
- R.S.A. 35 - Test - Irregular Frustum of Cone
- R.S.A. 36 - Test - Conical Gutter Outlet
- R.S.A. 37 - Test - Collar for Double Pitch Roof
- R.S.A. 38 - Test - Elliptical Flaring Pan
- R.S.A. 39 - Test - Tapered Square Pipe on Sq. Pipe
- R.S.A. 40 - Test - Cylinder on Cone Vertically



SHEET METAL COURSE  
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Course Outline (Continued)

- R.S.A. 41 - Test - No. 8-Cylinder on Cone Horizontally
- R.S.A. 42 - Test - No. 9--Cone on Cylinder
- R.S.A. 43 - Test - No. 10--Cone on Cone
- R.S.A. 44 - Test - No. 1-Square to Round on Center
- R.S.A. 45 - Test - No. 2-Rect., To Round off Center
- R.S.A. 46 - Test - No. 3-Rect., To Round off Center- 2 Ways
- R.S.A. 47 - Test - No. 4-Taper Joint off Center
- R.S.A. 48 - Test - No. 5-Rectangle to Triangle
- R.S.A. 49 - Test - No. 6-Irregular-Round to Oblong
- R.S.A. 50 - Test - No. 7-Irregular T-Joint
- R.S.A. 51 - Test - No. 8-Roof Collar Square to Round
- R.S.A. 52 - Test - No. 9-Scalene Cone
- R.S.A. 53 - Test No. 1, Flaring Roof Collar
- R.S.A. 54 - Test - No. 2, Roof Collar, Square to Round
- R.S.A. 55 - Test - No. 3, 3-piece Tapered Offset
- R.S.A. 56 - Test - No. 4, 3-piece Reducing Elbow
- R.S.A. 57 - Test - No. 5, 3-piece Transition-Square to Round
- R.S.A. 58 - Test - No. 6, Furnace Boot
- R.S.A. 59 - Test - No. 7, Tapering-y-Joint
- R.S.A. 60 - Test - Math-Area and Volumes
- R.S.A. 61 - See Instructor
- R.S.A. 62 - See Instructor
- R.S.A. 63 - See Instructor
- R.S.A. 64 - See Instructor



SMALL CRAFT OPERATION  
AND NAVIGATION  
Trade Preparatory

C Page 1 of 1

The Small Craft Operation and Navigation Course was published in 1960. It is available in book form.

A detailed outline of the Small Craft Operation and Navigation Course follows:

Introduction

Part I - Rules and Regulations

- Lesson 1 - Equipment Required by Regulations
- Lesson 2 - Classes of Vessels
- Lessons 3 & 4 - Rules of the Road
- Lesson 5 - Recommended Equipment to be Carried on Small Craft

Part II - Aids to Navigation

- Lesson 6 - Buoys and Markers
- Lesson 7 - Lights
- Lesson 8 - Charts
- Lesson 9 - The Use of Charts in Piloting
- Lesson 10 - Navigation in Fog and Other Conditions or Reduced Visibility

Part III - The Marine Compass and Piloting

- Lesson 11 - Historical Background and Construction
- Lesson 12 - Magnetism
- Lesson 13 - Compass Error

Appendix A - Common Nautical Terms

Appendix B - Equipment Required on Motor Boats

Appendix C - How Safe a Skipper are You?

Appendix D - Introduction to First Aid - For Lessons 1, 2, and 3

SMALL ENGINES MECHANICS  
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The Small Engines Mechanics Course was recently revised and is available in the following book form for instructors. It is available in loose form for the students.

Book I

Related Study Assignments	Units I-VI
Jobs	Units I-VI
Mathematics	Units I-VI

Book II

Related Study Assignments	Units VII-XIII
Jobs	Units VII-XIII

Test Book

Book I	Units I-XIII
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Answer Book

For Tests and Math	Units I-XIII
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The references for the Small Engines Mechanics Course are listed below:

Title	Source
A.B.C.'S OF HAND TOOLS	General Motors Corporation General Motors Technical Center Warren, Michigan
GENERAL REPAIR TOOLS FOR AUTO. MECHANICS	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
WALDES TRUARC RETAINING RING TECHNICAL MANUAL	Waldes Kohinoor, Inc. Long Island City, N. Y.
Catalog of Tubing Fittings	Imperial Eastman Corporation Imperial Brass Division 6300 West Howard Street Chicago 48, Illinois
SOLDERING SIMPLIFIED	Kester Solder Co. 4201 Wrightwood Avenue Chicago 48, Illinois
Atteberry, P. H. POWER MECHANICS	Goodheart-Willcox Co., Inc. 1322 S. Wabash Chicago 5, Illinois

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References (Continued)

Title	Source
SMALL ENGINES SERVICE MANUAL	Technical Publications, Inc. 1014 Wyandotte Street Kansas City 5, Missouri
Purvis, Jud ALL ABOUT SMALL GAS ENGINES	Goodheart-Willcox Co., Inc. 1322 S. Wabash Chicago 5, Illinois
GENERAL THEORIES OF OPERATION	Briggs and Stratton Corporation 2711 North Street Milwaukee 1, Wisconsin
Venk, Ernest THE COMPLETE OUTBOARD BOATING MANUAL	American Technical Society 848 East 58th Street Chicago 37, Illinois
REPAIRMAN'S HANDBOOK	Briggs and Stratton Corporation 2711 North Street Milwaukee 1, Wisconsin
SMALL ENGINES SERVICE MANUAL	Implement and Tractor Pub., Inc. 1014 Wyandotte Kansas City 5, Missouri
CLINTON ENGINES SALES AND SERVICE MANUAL	Clinton Engine Corporation Maquoketa, Iowa
MASTER PARTS AND SERVICE MANUAL	Tillotson Mfg. Co. Toledo 12, Ohio
TECUMSEH ENGINES MASTER PARTS AND SERVICE MANUAL	Tecumseh Products Parts Department Grafton, Wisconsin
CARTER CARBURETOR MASTER PARTS AND SERVICE MANUAL	Carter Carburetor Co. Division of ACF Industries St. Louis 7, Missouri
CLINTON CHAINSAW SALES AND SERVICE MANUAL	Clinton Engine Corporation Maquoketa, Iowa
LAWN BOY SERVICE MANUAL	Lawn Boy Division of Outboard Marine Corp. Galesburg, Illinois

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References (Continued)

BRIGGS AND STRATTON REPAIR INSTRUCTIONS, Form MS-3854	Briggs and Stratton Corporation 2711 North Street Milwaukee 1, Wisconsin
TECUMSEH ENGINES MECHANIC'S HANDBOOK	Tecumseh Products Parts Department Grafton, Wisconsin
MAGNETO IGNITION	Fairbanks, Morse and Co. 600 S. Michigan Ave. Chicago 5, Illinois
WHAT MAKES THE SPARK	R. E. Phelon Co. East Longmeadow, Mass.
WISCONSIN ENGINES INSTRUCTIONS BOOK AND PARTS LIST	Wisconsin Motor Corp. Milwaukee 46, Wisconsin
WICO ELECTRIC CO. SERVICE AND PARTS LIST	Wico West Springfield, Mass.
AUTO-LITE SPARK PLUG SERVICE MANUAL	The Leech-Neville Co. 1347 East 51st Street Cleveland 13, Ohio
A. C. SPARK PLUG SHOP MANUAL	Delco-Remy Division General Motors Corporation Anderson, Indiana
AUDEL'S GAS ENGINE MANUAL	Theo. Audel and Co. 49 West 23rd Street New York 10, New York
BENCHWORK, DRILLS, AND DRILLING (FILM NO. 3)	Jam Handy Organization 2821 E. Grand Blvd. Detroit, Michigan
BENCHWORK, REAMING, TAPPING, AND THREADING (FILM NO. 4) TAPPING AND THREADING, FRAMES 46 through 86	Jam Handy Organization 2821 E. Grand Blvd. Detroit, Michigan
CUSHMAN SERVICE MANUAL	Cushman Motor Works, Inc. Lincoln, Nebraska
Stephenson, George E. POWER MECHANICS	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York

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References (Continued)

THE LAWN MOWER SERVICE MANUAL	Yard-Man Inc. Jackson, Michigan
WESTERN TOOL AND STAMPING CO. PARTS AND PRICE CATALOG	Western Tool and Stamping Co. Des Moines, Iowa
OPERATING INSTRUCTIONS FOR THE MODEL 900 LAWN MOWER SHARPENER	Fate-Root-Heath Company Plymouth, Ohio
CHAIN SAW SERVICE MANUAL	Technical Publications, Inc. 1014 Wyandotte Street Kansas City 5, Missouri
CHAIN SAW SERVICE MANUAL	Implement and Tractor Pub., Inc. 1014 Wyandotte St. Kansas City 5, Missouri
JOHNSON SERVICE MANUAL	Johnson Motors Waukegan, Illinois
MASTER SERVICE MANUAL	Mercury Outboard Motors Kiekhaefer Corporation Beaver Dam, Wisconsin
OUTBOARD MOTOR AND BOATING GUIDE	Theo. Audel and Co. 49 West 23rd Street New York 10, New York

A detailed outline of the Small Engines Mechanics Course follows:

Introduction

Unit I - Basic Repair Skills

R.S.A.	1	Hand Tools and How to Use
Math	1	Linear Measurement
Math	2	Rule Practice
Job	1	Disassemble and Reassemble Used Engine
Job	2	Identify Hand Tools
Math	3	Addition of Rule Measurements
Job	3	Reshape screwdriver, Chisel, and Center Punch, Using Bench Grinder
Math	4	Subtraction of Rule Measurements
R.S.A.	2	Measuring Devices
R.S.A.	2A	The Micrometer
Job	4	Measure Crankshaft and Cylinder With Micrometers

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Course Outline (Continued)

R.S.A.	3	Fastening Devices and Related Items (Part I)
Job	5	Identify Bolts and Nuts
R.S.A.	3	Fastening Devices and Related Items (Part II)
Job	6	Identify Retaining Rings
R.S.A.	4	Drills, Taps, and Dies
R.S.A.	4A	Tools
Job	7	Make a Drill Gauge
Job	8	Make Internal Thread Block and Studs
R.S.A.	5	Installing Studs and Removing Broken Studs
Job	9	Remove a Broken Stud
R.S.A.	5A	Internal Thread Repairs
Job	10	Repair Internal Threads with Inserts
R.S.A.	6	Tubing and Fittings
Job	11	Make Up Replacement Fuel Line, Using Assorted Fittings
Job	12	Repair Internal Pipe Threads With Repair Insert
R.S.A.	7	Soldering
Job	13	Splice Insulated Wire
Job	14	Make a Solder Joint
Job	15	Sweat a Tank Fitting
R.S.A.	8	Bushings and Reamers
Job	16	Remove, Replace, and Ream a Bushing

Unit II- Engine Fundamentals

Introduction

R.S.A.	1	Theory of Operation - 2-Stroke Cycle Engines
Job	1	Disassemble and Reassemble 2-Cycle Engine
Math	5	The Decimal System
Math	6	Addition and Subtraction of Decimals
Job	2	Identify Engine Parts By Proper Name, Using Manufacturer's Parts Catalog (2-Cycle Engine)
R.S.A.	2	Theory of Operation - 4-Stroke Cycle Engines
Job	3	Disassemble and Reassemble Engine, 4-Stroke Cycle
Math	7	Multiplication and Division of Decimals
Job	4	Identify Parts by Name, 4-Cycle Engine, Using Manufacturer's Parts Catalog
Job	5	Start, Stop, and Store 2-Cycle Engine
Job	6	Start, Stop, and Store 4-Cycle Engine
R.S.A.	3	Principles and Operations of Small Gasoline Engines

Unit III - Fuel Systems

R.S.A.	1	Fuel Supply Systems
Job	1	Remove, Repair, and Replace Carburetor, Briggs and Stratton (Updraft)



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Course Outline (Continued)

R.S.A.	2	Float Carburetors
Job	2	Remove, Repair, and Replace Carburetor (Briggs and Stratton Float Type, Sidedraft)
R.S.A.	3	Governors
Job	3	Repair and Adjust Carburetor and Governor, Clinton Vertical Shaft Engine (Carter Carburetor)
R.S.A.	4	Diaphragm Carburetors
Job	4	Repair and Adjust Carburetor and Governor, Clinton Vertical Shaft Engine (Clinton or Walbro Carburetor)
Job	5	Repair and Adjust Carburetor and Governor, Lauson Series, Walbro Carburetor
Job	6	Repair and Adjust Carburetor and Governor, Power Products, (Tillotson Carburetor) AV Series
Job	7	Repair Carburetor, Double Diaphragm, Carter Model "ND"
Job	8	Repair Single Diaphragm Carburetor, (Lauson V Series Lightweight Engine) or Power Products Engine (Tecumseh Carburetor)
R.S.A.	5	Air Cleaners
Job	9	Repair and Adjust Carburetor and Governor Lawn Boy "C" Series Engine
R.S.A.	6	Remote Control System
Job	10	Repair and Adjust Remote Control System (Craftsman Lawn Mower With Handle Mounted Dial Control)
Job	11	Install a Bowden Wire Remote Control System

Unit IV - Magneto Ignition

R.S.A.	1	Magnetism and Electricity
Job	1	Repair Ignition System, Briggs & Stratton Aluminum Horizontal Series Engine
R.S.A.	2	Flywheel Magnetos
Job	2	Repair Ignition System, Briggs and Stratton Small Cast Iron Series
Job	3	Repair Ignition System, Briggs & Stratton "Magnematic Ignition System"
R.S.A.	3	Trouble Shooting Information
Job	4	Repair Ignition System, Clinton Vertical Shaft Aluminum Engine Series
Job	5	Repair Ignition System Clinton Vertical Shaft, Two Cycle
Job	6	Repair Ignition System, Lauson V-Series, Wico Magneto
R.S.A.	4	High Tension Magnetos
Job	7	Repair High Tension Magneto (Wico Model XH-1) (as used on Wisconsin AE, AEH, AEN Series)



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Course Outline (Continued)

- Job 8 Repair High Tension Magneto (Multi-Cylinder  
Model as used on Wisconsin 4-Cylinder Engine)  
(Fairbanks Morse Type FM-X4A7B)
- R.S.A. 5 Spark Plugs

Unit V - Starting Systems

- R.S.A. 1 Manual Starters
- Job 1 Repair Rewind Starter, Briggs and Stratton
- Job 2 Disassemble and Repair Rewind, Clinton Engine  
(Fairbanks Morse Starter)
- Job 3 Repair Recoil Starter (Clinton Starter)
- Job 4 Repair Rewind Starter, Clinton Engine (Schnake  
Starter)
- Job 5 Repair Rewind Starter, Lawn Boy C Series Engine
- Job 6 Repair Rewind Starter, Tecumseh Engine (Eaton  
Starter)
- Job 7 Repair Wind-Up Starter, Briggs and Stratton,  
Vertical Shaft Engine
- Job 8 Repair Wind-Up Starter, Tecumseh Engine, "Self  
Starter"
- R.S.A. 2 Wind-Up Starters
- Job 9 Repair Wind-Up Starter, Clinton "Impulse Starter"

Unit VI - Engine Overhaul

Introduction:

- R.S.A. 1 Cooling
- Job 1 Clean and Inspect Air-Cooling System (Any Make)
- R.S.A. 2 Valve Systems
- Job 2 Reface Valves
- Job 3 Remove, Replace, and Reseat Valve Seats
- Job 4 Perform Valve and Seat Reconditioning Job (Briggs  
and Stratton Engine, Small Series, Lightweight)
- Job 5 Perform Valve and Seat Reconditioning Job (Clinton  
Engine, Lightweight Series)
- Job 6 Recondition Valve System, Tecumseh Engine (4-Cycle)
- Job 7 Recondition Valve System, Wisconsin 2 or 4-Cylinder  
Engine
- R.S.A. 3 Cylinders
- Job 8 Hone Aluminum Cylinder for Oversize Piston
- Job 9 Hone Cylinder For Oversize Piston (Cast Iron)
- R.S.A. 4 Pistons, Rings, Pins, and Connecting Rods
- Job 10 Bore Cylinder For Oversize Piston
- Job 11 Remove and Replace Connecting Rod, Piston, and  
Piston Rings. (Briggs & Stratton Lightweight  
Series, Vertical Shaft Engine)

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Course Outline (Continued)

- |        |    |  |
|--------|----|--|
| Job    | 12 | Remove and Replace Connecting Rod and Piston Assembly, Clinton Lightweight VS Series           |
| Job    | 13 | Remove and Replace Connecting Rod and Piston Assembly, Tecumseh 2-Cycle, Vertical-Shaft Engine |
| R.S.A. | 5  | Camshafts, Crankshafts, Bearings and Seals   |
| Job    | 14 | Remove and Replace Crankshaft and Main Bearings, Tecumseh "V" Series, 4 Cycles                 |
| Job    | 15 | Remove and Replace Crankshaft and Main Bearings, Tecumseh 2-Cycle Engine                       |
| R.S.A. | 6  | Oil Pumps  |
| Job    | 16 | Complete Engine Overhaul, Briggs and Stratton Model 8 Engine                                   |
| Job    | 17 | Complete Engine Overhaul, Clinton "V" Series Lightweight 4 Cycle                               |
| Job    | 18 | Complete Engine Overhaul, Lawn Boy C Series  |
| Job    | 19 | Complete Engine Overhaul, Briggs and Stratton (Cast Iron Series, 3 HP or above)                |
| Job    | 20 | Complete Engine Overhaul (Wisconsin 2 or 4 Cylinder Engine)                                    |

Unit VII - Clutches and Drive Mechanisms

- |        |   |  |
|--------|---|--|
| R.S.A. | 1 | Centrifugal Clutches                                   |
| Job    | 1 | Repair Centrifugal Clutch, Drum Type                   |
| Job    | 2 | Repair Centrifugal Clutch, Disc Type (Cushman Scooter) |
| R.S.A. | 2 | Manual Clutches  |
| R.S.A. | 3 | Belt and Chain Drives                                  |
| Job    | 3 | Repair and Adjust Belt Drive Assembly                  |
| Job    | 4 | Repair and Adjust Chain Drive Assembly                 |
| R.S.A. | 4 | Transmissions  |
| Job    | 5 | Repair Transmission                                    |
| R.S.A. | 5 | Differentials  |
| Job    | 6 | Repair Differential                                    |

Unit VIII - Grass Cutting Equipment

Introduction:

- |        |   |  |
|--------|---|--|
| R.S.A. | 1 | Rotary Lawn Mowers                             |
| Job    | 1 | Remove, Repair, and Replace Rotary Mower Blade |
| Job    | 2 | Overhaul Self-Propelled Rotary Mower, Complete |
| R.S.A. | 2 | Reel Type Lawn Mowers                          |
| Job    | 3 | Adjust Bed-Knife Clearance and Lubricate Mower |
| Job    | 4 | Grind a Bed Knife and Reel                     |
| Job    | 5 | Complete Overhaul, Reel Type Power Mower       |

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Course Outline (Continued)

Unit IX - Refinishing

- |        |   |   |
|--------|---|---|
| R.S.A. | 1 | Painting, Refinishing, and Preparations |
| Job    | 1 | Prepare a Lawn Mower for Refinishing    |
| R.S.A. | 2 | Paints, Lacquers, and Thinners          |
| Job    | 2 | Paint a Lawn Mower with Spray Gun       |

Unit X - Chain Saws

- |        |   |                                 |
|--------|---|---------------------------------|
| R.S.A. | 1 | Chain Saw Operation             |
| Job    | 1 | File and Adjust Chain, Any Make |
| Job    | 2 | Repair Chain Saw Oiling System  |
| Job    | 3 | Repair Clutch                   |
| Job    | 4 | Repair Chain Saw Transmission   |
| Job    | 5 | Overhaul Chain Saw, Complete    |

Unit XI - Pumps

- |        |   |                                 |
|--------|---|---------------------------------|
| R.S.A. | 1 | Centrifugal and Diaphragm Pumps |
| Job    | 1 | Overhaul a Centrifugal Pump     |
| Job    | 2 | Overhaul a Diaphragm Pump       |

Unit XII - Outboard Engine Fuel Systems

- |        |   |  |
|--------|---|--|
| R.S.A. | 1 | Remote Fuel-Supply Systems   |
| Job    | 1 | Repair Outboard Remote Fuel System   |
| R.S.A. | 2 | Outboard Engine Carburetion  |
| Job    | 2 | Repair Carburetor, Johnson or Evinrude, 2 Cylinder<br>(with electric choke)            |
| Job    | 3 | Repair and Adjust Dual Carburetors, Mercury<br>4 Cylinder                              |
| Job    | 4 | Repair Two-Barrel Carburetor, Johnson or Evinrude<br>4 Cylinder (with automatic choke) |

Unit XIII - Outboard Engine Ignition

- |        |   |   |
|--------|---|---|
| R.S.A. | 1 | Outboard Magnetos   |
| Job    | 1 | Repair and Synchronize Outboard Magneto, 2 Cylinder<br>Engine |
| Job    | 2 | Repair and Synchronize Outboard Magneto 4 Cylinder<br>Engine  |
| R.S.A. | 2 | Battery Ignition  |
| Job    | 3 | Repair Outboard Engine Battery Ignition System                |

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Units I - VII of the Tractor Maintenance and Repair Course was published in 1953-1954, Units VIII - XIV in 1958. It is available in the following forms:

Math, Related Study Assignments, Jobs and Job Information Sheets are all in Packages for students. Book forms are available for the Instructors.

Book I - Units I and II

Book II - Units III and IV

Book III - Units V, VI and VII

Book IV - Units VIII through XIV

Test Book

Includes all test for Units I - XIV

Answer Book

Complete for Units I - XIV

The following instructor's aids are available:

Permanent Record Folders

Wall Progress Charts

The references for the Tractor Maintenance and Repair Course are the following:

Title	Source
Jones, Fred, FARM GAS ENGINE AND TRACTORS	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Johnson, SERVICING AND MAINTAINING FARM TRACTORS	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
I AND T SHOP SERVICE BOOK	Implement and Tractor Pub., Inc. Graphic Arts Building Kansas City 5, Missouri
OPERATORS MANUAL	
SPARK PLUG CLEANER MANUFAC- TURER'S SERVICE MANUAL	
MOTOR'S TRUCK AND TRACTOR REPAIR MANUAL	Motor 250 West 55th Street New York
Delco-Remy ELECTRICAL EQUIPMENT OPERATION AND MAINTENANCE HANDBOOK	Delco-Remy Division General Motors Anderson, Indiana

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References (Continued)

Title	Source
MOTOR'S AUTO REPAIR MANUAL	Motor 250 West 55th Street New York 19, New York
Crouse, AUTOMOTIVE MECHANICS, Second Edition	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
BORING BAR MANUFACTURERS MANUAL	
Kuns, AUTO MECHANICS Book One	American Technical Society 848 East 58th Street Chicago 37, Illinois
A.B.C.'S OF HAND TOOLS	General Motors Corporation General Motors Building 3044 West Grand Boulevard Detroit 2, Michigan
Morrison, Ivan, Gregg, FARM TRACTOR MAINTENANCE, 1946	The Interstate Printers and Publishers, Inc. Jackson at Van Buren Danville, Illinois

A detailed outline of the Tractor Maintenance and Repair Course follows:

UNIT I: PREVENTIVE MAINTENANCE FUNDAMENTALS

PACKAGE #1

Math	1	The Steel Rule
R.S.A.	1	Fastening Devices, Calipers, and Thread Gages
Job	1	Identify Bolts and Nuts

PACKAGE #2

R.S.A.	2	Drills, Taps, and Dies
Job	2	Make Internal Thread Block and Studs
J.I.S.	1	Tools (For use with Job 2)

PACKAGE #3

R.S.A.	3	Installing Studs and Removing Broken Studs
Job	3	Remove a Broken Stud
Math	2	Addition and Subtraction of Scale Measurements

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Course Outline (Continued)

UNIT I (Continued)

PACKAGE #4

R.S.A. 4 Soldering  
Job 4 Make a Solder Joint

PACKAGE #5

Job 5 Start, Operate and Stop Tractor

PACKAGE #6

R.S.A. 5 Hand Tools and How to Use  
Job 6 Identify Hand Tools

PACKAGE #7

R.S.A. 6 Tire Service  
Job 7 Remove, Repair, and Replace Tire and Tube

PACKAGE #8

Math 3 Addition and Subtraction of Whole Numbers  
R.S.A. 7 Lubrication  
Job 8 Lubricate Tractor

PACKAGE #9

R.S.A. 8 Lubricating Oils and Oil Filters  
Job 9 Drain, Flush, Refill Crankcase and Service Oil Filter

PACKAGE #10

R.S.A. 9 Battery Service  
Job 10 Service a Battery

PACKAGE #11

R.S.A. 10 Cooling Systems  
Job 11 Flush Cooling System

UNIT II: FRONT AXLE AND STEERING GEAR

PACKAGE #12

R.S.A. 11 Front Wheel Service  
Job 12 Remove, Repack, and Adjust Front Wheel Bearings  
Math 4 Multiplication of Whole Numbers



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Course Outline (Continued)

UNIT II (Continued)

PACKAGE #13

R.S.A. 12 Front Axles  
Job 13-B Set Toe-In (Ford, 8N)  
Job 13-C & E Set Toe-In (Farmall, Super-A and Case, LA)  
Math 5 Division of Whole Numbers

PACKAGE #14

R.S.A. 13 Reamers and Reaming  
Job 14-B Renew Spindle Bushings (Ford, 8N)  
Job 14-C Rebush Steering Knuckles (Farmall, Super-A)  
Job 14-E Renew Kingpin Bushings (Case, LA)  
Job 15-B Renew Axle Pin Bushing (Ford, 8N)  
Job 15-C Renew Axle Pivot Shaft Bushings (Farmall Super-A)  
Job 15-E Renew Axle Pivot Shaft Bushing (Case L.A.)  
Math 6 Changing Fractions

PACKAGE #15

Job 16-A Renew Vertical Spindle Bushing (John Deere-B)  
Job 17-A Repair Roll-O-Matic (John Deere-B)  
Job 18-D Renew Front Wheel Felt Washers (Allis-Chalmers, W.C.)  
R.S.A. 14 Steering Gears and Adjustment  
Job 19-A Adjust Steering Gear (John Deere-B)

PACKAGE #16

Job 19-B Adjust Steering Gear (Ford, 8N)  
Job 19-D Adjust Steering Gear (Allis-Chalmers, W.C.)  
Job 19-E Adjust Steering Gear (Case, LA)  
R.S.A. 15 Tie Rod Ends and Universal Joints  
Job 20-B Overhaul Steering Gear (Ford, 8N)  
Job 20-C Overhaul Steering Gear (Farmall, Super-A)  
Job 20-E Overhaul Steering Gear (Case, LA)

Unit III: Cooling System

PACKAGE #17

R.S.A. 16 Radiators and Radiator Service  
Math 7 Addition and Subtraction of Fractions  
Job 21 Remove and Repair Radiator

PACKAGE #18

R.S.A. 17 Fans and Fan Drives  
Math 8 Multiplication of Fractions  
Job 22-A Repair Fan Assembly (John Deere-B)  
(Hood and Radiator Removed)



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Course Outline (Continued)

UNIT III (Continued)

PACKAGE #18 (Continued)

- Job 22-C Repair Fan Assembly (Farmall Super-A)
- Job 23-A Check and Repair Ventilator Pump (John Deere-B)  
(Fan Assembly Removed)

PACKAGE #19

- Math 9 Division of Fractions
- R.S.A. 18 Water Pumps
- Job 24-B Remove, Repair, and Replace Water Pump (Ford 8N)
- Job 24-D Remove, Repair, and Replace Water Pump  
(Allis-Chalmers WC)
- Job 24-E Remove, Repair, and Replace Water Pump  
(Case LA)

PACKAGE #20

- R.S.A. 19 Thermostats, Shutters, and Temperature Gages
- Job 25 Remove, Check, and Replace Thermostat  
(Radiator Drained)

UNIT IV: ATTACHMENTS

PACKAGE #21

- R.S.A. 20 Power Take-offs and Drawbars
- Job 26-C Remove, Repair, and Replace Power Take-Off  
(Farmall, Super-A) (To be performed with  
Job No. 27-C)
- Job 26-D Remove, Repair, and Replace Power Take-Off  
(Allis-Chalmers W.C.)
- Job 26-E Remove, Repair, and Replace Power Take-Off  
(Case LA)

PACKAGE #22

- Math 10 Pulley Speeds and Sizes
- R.S.A. 21 Belt Pulleys and Pulley Speeds
- Job 27-B Remove, Repair, and Replace Belt Pulley (Ford 8N)
- Job 27-C Remove, Repair, and Replace Belt Pulley (Farmall,  
Super-A) (To be performed with Job No. 26-C)
- Job 27-D Remove, Repair, and Replace Belt Pulley (Allis-  
Chalmers W.C.)

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Course Outline (Continued)

UNIT IV: (Continued)

PACKAGE #23

Math	11	The Decimal System
R.S.A.	22	Lighting Systems, Lights and Light Switches
Job	28-A	Install Lighting Attachment (John Deere-B)
Job	28-B	Install Lighting System (Ford 8N)
Job	28-C	Install Lighting System (Farmall, Super-A)
Job	28-D	Install Lighting System (Allis-Chalmers, W.C.)
Job	28-E	Install Lighting System (Case, LA)

PACKAGE #24

Math	12	Addition and Subtraction of Decimal Fractions
R.S.A.	23	Basic Hydraulic Principles and General Power Lift Operation
R.S.A.	23-A	Powr-Trol and Power Lift (John Deere, B)*
R.S.A.	23-B	Hydraulic Control (Ford 8N)
R.S.A.	23-C	Touch-Control (Ford 8N)
R.S.A.	23-E	Hydraulic Control Unit (Case L.A.)
Job	26-B	Remove and Repair Power Take-Off Shaft (Ford 8N)
Job	29-A	Repair Powr-Trol (John Deere-B)
Job	29-B	Remove, Repair, and Replace Hydraulic Control (Ford, 8N)
Job	29-C	Remove, Repair, and Replace Touch Control (Farmall, Super-A)
Job	29-D	Remove, Repair, and Replace Mechanical Lift (Allis-Chalmers, W.C.)
Job	29-E	Remove, Repair, and Replace Hydraulic Control Unit (Case, LA)

UNIT V: REAR AXLE, FINAL DRIVE, AND BRAKES

PACKAGE #25

Math	13	Multiplication of Decimal Fractions
R.S.A.	24	Bearings, Seals and Closures
Job	30-C	Remove, Repair and Reassemble Final Drive (Farmall, Super-A)
Job	30-D	Disassemble, Repair, and Reassemble Final Drive (Allis-Chalmers, WC)
R.S.A.	25	Tractor Final Drives
Job	33-D	Remove, Repair, and Replace Brakes (Allis Chalmers W.C.) (Final Drive Disassembled)

PACKAGE #26

R.S.A.	26	Types of Rear Axles and Their Adjustments
Job	31-A	Remove and Renew Rear Axle Bearings or Seals (John Deere-B)

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Course Outline (Continued)

UNIT V (Continued)

PACKAGE #26 (Continued)

- Job 31-B Remove and Renew Rear Axle Bearings or Seals  
(Ford 8N)
- Job 31-E Remove and Renew Rear Axle Bearings or Seals  
(Case, LA)

PACKAGE #27

- Math 14 Division of Decimals
- R.S.A. 27 Brakes
- Job 32-A Adjust Brakes (John Deere-B)
- Job 32-B Adjust Brakes (Ford 8N)
- Job 32-C Adjust Brakes (Farmall, Super-A)
- Job 32-D Adjust Brakes (Allis Chalmers, WC)
- Job 32-E Adjust Brakes (Case, LA) (Mechanical-Internal Expanding)
- Job 32-E Adjust Hydraulic Brakes (Case, LA) (Minor Adjustment)
- Job 32-E Adjust Hydraulic Brakes (Case, LA) (Major Adjustment)
- Job 32-X Adjust Disc Type Brakes (All Models)
- Job 33-A Remove, Repair, and Replace Brakes (John Deere-B)
- Job 33-B Disassemble, Repair and Reassemble Brakes  
(Ford 8N) (Wheel and Brake Drum Removed)
- Job 33-E Remove, Repair, and Replace Brakes (Case, LA)
- Job 33-E Disassemble, Repair, and Reassemble Brakes (Case, LA)  
(Hydraulic Brakes)
- Job 33-X Remove, Repair, and Replace Disc Brakes (All Models)

UNIT VI: DIFFERENTIAL

PACKAGE #28

- Math 15 Changing Common Fractions to Decimals
- Math 16 The Micrometer
- R.S.A. 28 Ring Gear and Pinion Adjustments
- Job 34-C Adjust Ring Gear and Pinion (Farmall, Super-A)  
(Final Drive Removed)
- Job 34-D Adjust Ring Gear Backlash (Allis-Chalmers, WC)
- R.S.A. 29 Differential Construction and Operation
- Job 35-A Remove, Repair, and Reassemble Differential  
(John Deere-B)
- Job 35-B Remove, Repair, and Reassemble Differential  
(Ford, 8-N)
- Job 35-C Remove, Repair, and Reassemble Differential  
(Farmall, Super-A)
- Job 35-D Remove, Repair and Reassemble Differential (Allis  
Chalmers, WC.)
- Job 35-E Remove, Repair, and Reassemble Differential (Case,  
LA.) (To be performed with Jobs 37-E and 38-E)

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Course Outline (Continued)

UNIT VI (Continued)

PACKAGE #28 (Continued)

- Job 36-D Disassemble, Repair, and Reassemble Torque Tube  
(Allis-Chalmers, WC.)  
R.S.A. 30 Getting and Holding a Job

UNIT VII: TRANSMISSIONS

PACKAGE #29

- R.S.A. 31 Transmission Shifter Mechanism  
Job 37-A1 Disassemble, Repair, and Reassemble Shifter  
Mechanism (John Deere-B) (Differential Removed)  
(Serial No. B-9600 to B-201000)  
Job 37-A2 Disassemble, Repair, and Reassemble Shifter  
Mechanism (John Deere-B) (Differential Removed)  
(Serial No. B-201000 and Up)  
Job 37-B Disassemble, Repair, and Reassemble Shifter  
Mechanism (Ford, 8-N) (Differential Removed)  
Job 37-C Remove, Repair, and Replace Shifter Mechanism  
(Farmall, Super-A)  
Job 37-D Remove, Repair, and Replace Shifter Mechanism  
(Allis-Chalmers, WC.)  
Job 37-E Repair and Replace Shifter Mechanism (Case, LA.)  
(Differential Removed)

PACKAGE #30

- Math 17 Gear Ratios  
R.S.A. 32 Transmissions  
R.S.A. 32-A1 Transmission Construction and Operation  
(John Deere-B, Serial No. B-96000 to B-201000)  
Job 38-A1 Disassemble, Repair, and Reassemble Transmission  
(John Deere-B) (Differential and Shifter  
Mechanism Removed) (Serial No. B-96000 to B-201000)  
R.S.A. 32-A2 Transmission Construction and Operation (John  
Deere-B, Serial No. B-201000 and up)  
Job 38-A2 Disassemble, Repair, and Reassemble Transmission  
(John Deere-B Serial No. B-201000 and up)  
(Differential and Shifter Mechanism)  
R.S.A. 32-B Transmission Construction and Operation (Ford, 8-N)  
Job 38-B Disassemble, Repair, and Reassemble Transmission  
(Ford, 8-N) (To be Performed with Job No. 37-B)  
Job 38-C Disassemble, Repair, and Reassemble Transmission  
(Farmall, Super A.) (Differential Removed)  
Job 38-D Remove, Repair, and Replace Transmission  
(Allis-Chalmers, W.C.) (Differential and Torque  
Tube Removed)  
Job 38-E Disassemble, Repair, and Reassemble Transmission  
(Case, LA) (Differential and Shifter Mechanism  
Removed)

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Course Outline (Continued)

UNIT VIII: CLUTCHES

PACKAGE #31

R.S.A.	33	Types of Clutches; Care and Operation
Math	18	Simple Percentage
Job	39-A	Repair and Adjust Clutch, Farmall A, B, or C
Job	39-B	Repair and Adjust Clutch, Allis-Chalmers WD
Job	39-C	Repair and Adjust Clutch, Ford 8N
Job	39-D	Repair and Adjust Clutch, John Deere B

UNIT IX: FUEL SYSTEMS

PACKAGE #32

R.S.A.	34	Fuel Supply and Carburetion Systems
Job	40-A	Remove, Repair, and Replace Carburetor, Farmall A, B, or C
Job	40-B	Remove, Repair, and Replace Carburetor, Allis-Chalmers WD.
Job	40-C	Remove, Repair, and Replace Carburetor, Ford 8N
Job	40-D	Remove, Repair, and Replace Carburetor, John Deere B

PACKAGE #33

R.S.A.	35	Governors, Types and Operation
Math	19	Discount
Job	41-A	Remove, Repair, and Replace Governor, Farmall A, B, or C
Job	41-B	Remove, Repair, and Replace Governor, Allis-Chalmers WD
Job	41-C	Remove, Repair, and Replace Governor, Ford 8N
Job	41-D	Remove, Repair, and Replace Governor, John Deere B

UNIT X: MAGNETO IGNITION

PACKAGE #34

R.S.A.	36	Magnetism and Electricity
R.S.A.	37	Magneto Construction and Operation
Job	42-A	Disassemble, Repair and Reassemble Magneto, Farmall A, B, or C

PACKAGE #35

R.S.A.	38	Impulse-Starter Couplings; Timing and Care of the High-Tension Magneto
Math	20	Personal Checks and Drafts
Job	42-B	Disassemble, Repair and Reassemble Magneto, Allis-Chalmers WD
Job	42-C	Disassemble, Repair and Reassemble Magneto, (John Deere B)



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Course Outline (Continued)

UNIT XI: BATTERY IGNITION

PACKAGE #36

- R.S.A. 39 Types and Requirements of Battery Ignition Systems  
Job 43-A Disassemble, Repair, and Reassemble Distributor,  
Farmall A, B, or C.  
Job 43-B Disassemble, Repair, and Reassemble Distributor,  
Allis-Chalmers WD

PACKAGE #37

- R.S.A. 40 Coils, Condensers, Contact Points, Distributor,  
and Spark Plugs  
Job 43-C Disassemble, Repair and Reassemble Face Mounted  
Distributor, Ford 8N  
Job 43-D Disassemble, Repair, and Reassemble Angle Mounted  
Distributor, Ford 8N  
Job 43-E Remove, Clean, Adjust and Replace Spark Plugs

UNIT XII: CRANKING MOTORS

PACKAGE #38

- R.S.A. 41 Operating Principles of Cranking Motors and Drivers  
Math 21 Work Orders and Bills  
Job 44 Remove, Overhaul, and Replace Cranking Motor

UNIT XIII:

PACKAGE #39

- R.S.A. 42 Generator Construction and Operation  
Job 45 Remove, Disassemble, Repair and Replace a Generator

PACKAGE #40

- R.S.A. 43 Cutout Relays and Step-voltage Controls  
Math 22 Keeping Accounts  
Job 46 Remove, Check, and Adjust Step-voltage Control

UNIT XIV: ENGINES

PACKAGE #41

- R.S. A. 44 Engine Fundamentals  
Job 47 Clean Engine With Cold or Hot Degreasing Solution  
Job 48 Remove and Replace Expansion Plug

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Course Outline (Continued)

PACKAGE #42

R.S.A. 45 Valve Types and Construction  
R.S.A. 46 Valve Mechanisms  
Job 49 Reface Rocker Arms

PACKAGE #43

R.S.A. 47 Valve Service  
Job 50 Remove, Clean, and Replace Rocker Arms  
Job 51 Grind Valves on I-Head Engine  
Job 52 Grind Valves on L-Head Engine

PACKAGE #44

R.S.A. 48 Pistons, Piston Rings, Cylinders and Sleeves  
Job 58 Remove Old and Install New Piston Rings  
Job 59 Remove Old and Install New Cylinder Sleeves, Dry Type  
Job 60 Remove and Install Cylinder Sleeve, Wet Type  
Job 61 Rebore Cylinder  
Job 62 Hone Cylinder and Fit Piston

PACKAGE #45

R.S.A. 49 Piston Pins and Bushings, Connecting Rods, Crankshaft and Main Bearings  
Job 53 Remove Old and Fit New Piston Pins and Bushings  
Job 54 Install New Ring Gear on Flywheel  
Job 55 Adjust Connecting Rod Bearings with Engine in Tractor, John Deere (Shim Type)  
Job 56 Install New Connecting Rod Bearings With Engine in Tractor (Insert Type)  
Job 57 Adjust Main Bearings, John Deere B

PACKAGE #46

R.S.A. 50 Engine Lubrication Systems  
Job 63 Remove, Inspect, and Replace Oil Pump

PACKAGE #47

Job 64 Overhaul Engine Completely (Except John Deere)

PACKAGE #48

Job 65 Overhaul Engine Completely, John Deere B



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The Vocational-Technical Drawing Course was written in 1964-65. It is available in book form for the instructors and in loose form for distribution to students. There are twenty-two units of Related Study Assignments and Jobs with accompanying tests and answers.

Unit	I	Introduction and Orientation
RSA	1	History of the Occupation
RSA	2	The Draftsman and Specialization
RSA	3	Drafting Instruments and Materials
RSA	4	Nature of the Work and Employment Outlook
RSA	5	How to Use Instructional Material
Unit	II	Lettering
RSA	1	Sheet Layout
Math	1	Common Fractions
Job	1	Draw Horizontal and Vertical Lines
RSA	2	Lettering - Vertical Caps - The Straight Line Group
Math	2	Partitive Fractions
Job	2	Practice Free-Hand Lettering - The Straight Line Group
RSA	3	The Circle Group
Math	3	Equivalent Fractions and the Golden Rule
Job	3	Practice Free-Hand Lettering, The Circle Group
RSA	4	Lettering - Numerals and Fractions
Math	4	Reduction of Common Fractions
Job	4	Practice Lettering Numerals and Fractions
RSA	5	Lower Case Letters
Math	5	Reduction of Improper Fractions
Job	5	Practice Lower Case Letters
RSA	6	Inclined Lettering
Math	6	Writing a Mixed Number as a Fraction
Job	6	Practice Inclined Lettering
RSA	7	Lettering - Proportion, Stability, Size and Spacing
Math	7	Like and Unlike Fractions
Job	7	Lettering - Practice Proportion, Size and Spacing
RSA	8	Compression and Extension
Math	8	Addition of Fractions
Job	8	Practice Compression and Extension
RSA	9	Lettering - Notes and Titles
Math	9	Subtraction of Fractions
Job	9	Letter Notes and Titles
RSA	10	Lettering Styles for Architectural Draftsmen
Math	10	Multiplication of Fractions
Job	10	Practice Letter Styles
RSA	11	Review of Unit II
Math	11	Division of Fractions
Job	11	Review Lettering

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Course Outline (Continued)

Unit	III	Geometric Construction
RSA	1	Geometric Construction - Straight Lines
Math	1	Circle Circumference
Job	1	Geometric Construction
RSA	2	The Circle
Math	2	Circle Diameters and Radii
Job	2	Construct Circles and Center Lines
RSA	3	Geometric Construction - Circles
Math	3	Area of Circles, Sectors and Segments
Job	3	Geometric Construction - Circles
RSA	4	Geometric Construction - Arcs
Math	4	Square Areas
Job	4	Geometric Construction - Fillets and Rounds
RSA	5	Geometric Construction - Arcs Tangent to Arcs and Circles
Math	5	Areas
Job	5	Geometric Construction - An exterior Arc Tangent to a Circle and a Straight Line
RSA	6	Geometric Construction - The Reverse or Ogee Curve
Math	6	Areas - Area of Transportation
Job	6	Geometric Construction - Construct a Reverse or Ogee Curve
RSA	7	Geometric Construction - Plane Figures
Math	7	Area of Triangles
Job	7	Geometric Construction - Plane Figures
RSA	8	Geometric Construction - Plane Figures, the Hexagon and Octagon
Math	8	Area of Polygons
Job	8	Geometric Construction - Hexagons
RSA	9	Geometric Construction - The Ellipse and its Straight Line Tangents
Math	9	Areas - Area of Ellipses
Job	9	Geometric Construction - Construct a Parabola
RSA	10	Geometric Construction - Parabolas
Math	10	Areas - Area of a Parabola
Job	10	Geometric Construction - Construct a Parabola
Unit	IV	Dimensioning
RSA	1	Dimensioning - Line Conventions
Math	1	Decimal Fractions - Using Conversion Table
Job	1	Dimensioning - Line Conventions
RSA	2	Dimensioning - Rectangles
Math	2	Decimal Fractions - Meaning of Decimal Fractions
Job	2	Dimensioning - Rectangles
RSA	3	Dimensioning - Size and Location
Math	3	Decimals - Reduction to Lower Terms
RSA	4	Dimensioning - Circles, Arcs and Curves - Size and Location Dimensions

Unit IV Dimensioning  
(Continued)

Math	4	Decimal Fractions - Addition
Job	4	Dimensioning - Circles, Arcs and Curves
RSA	5	Dimensioning - Angles
Math	5	Decimal Fractions - Subtraction
Job	5	Dimensioning - Angles
RSA	6	Dimensioning - Counterbored and Countersunk Holes, Chamfers and Keyways
Math	6	Decimal Fractions - Multiplication
Job	6	Dimensioning - Holes, Chamfers and Keyways
RSA	7	Dimensioning - Conical Tapers, Flat Tapers and Machine Tapers
Math	7	Decimal Fractions - Division of Decimals by Whole Numbers
Job	7	Dimensioning Tapers
RSA	8	Dimensioning - Tolerances
Math	8	Decimal Fractions - Division by a Decimal
Job	8	Dimensioning - Tolerances

Unit	V	Single View Drawings
RSA	1	Single View Drawings
Job	1	Single View Drawing - Rectangular Combinations
RSA	2	Single View Drawings - Laying out the Drawing
Job	2	Single View Drawings - Angular Surfaces
RSA	3	Single View Drawings - Order of Pencilling
Job	3	Single View Drawings - Circles and Arcs
RSA	4	Single View Drawings - Finished Drawings
Job	4	Single View Drawings - Construct a Finished Drawing
Job	5	Single View Drawings - Reverse Curves and Circles Tangent
Job	6	Single View Drawings - Elliptical Shapes
Job	7	Single View Drawings - Parabolic Curves

Unit	VI	Multi-View Drawings
RSA	1	Theory of Visualization of the Three Principal Views
Job	1-15	Multi-View Drawings - Surface Identification
RSA	2	Multi-View Drawings - Laying Out the Front and Top Views
Job	16	Multi-View Drawings - Lay Out and Draw Front and Top Views
RSA	3	Multi-View Drawings - Laying Out The Right-Side View
Job	17	Multi-View Drawings - Laying Out the Right-Side View Using 45° Miter Method
Job	18	Multi-View Drawings - Laying Out the Right-Side View, Using Radial Point Method
RSA	4	Multi-View Drawings - Invisible Surfaces - Technique of Hidden Lines

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Unit VI Multi-View Drawings  
(Continued)

- Job 19 Multi-View Drawings - Hidden-Line Technique
- RSA 5 Multi-View Drawings - Tangent Surfaces
- Job 20 Multi-View Drawings - Tangent Surfaces
- RSA 6 Multi-View Drawings - Fillets, Rounds and Runouts
- Job 21 Multi-View Drawings - Fillets, Rounds and Runouts
- RSA 7 Multi-View Drawings - Projection of Inclined Surfaces and Oblique Surfaces
- Job 22-30 Multi-View Drawing - Projection of Inclined Surfaces and Oblique Surfaces
- RSA 8 Multi-View Drawing - Left Side, Back and Bottom Views
- Job 31 Multi-View Drawings - Projecting the Left-Side View
- Job 32-35 Orthographic Views From Pictorials

Unit VII Auxiliary Views

- RSA 1 Auxiliary Views - Use of Arcs for Projecting Auxiliaries
- Job 1 Construct Auxiliary by Using Arcs
- RSA 2 Auxiliary Views - The Reference Plane Against the Front Surface
- Job 2 Construct an Auxiliary by Use of a Reference Line
- RSA 3 Auxiliary Views - The Reference Plane Against an Inner Surface
- Job 3 Reference Line on Inner Surface
- RSA 4 Auxiliary Views - The Reference Plane as a Center Line
- Job 4 The Reference Plane and the Center Line
- RSA 5 Auxiliary Views - Circular and Curved Inclined Surfaces
- Job 5 Auxiliary Views - Completion of Principal Views by Auxiliary--Circles and Curves
- RSA 6 Auxiliary Views - Oblique Surfaces
- Job 6 Auxiliary Views - Completion of Principal Views by Auxiliary--Circles and Curves
- Job 7-8 Auxiliary Views - Oblique Surfaces
- Job 9-12 Auxiliary Views - Additional Problems

Unit VIII Sectional Views

- RSA 1 Sectional Views - Usage and Symbols
- Job 1 Sectional Views - Usage and Symbols
- RSA 2 The Cutting Plane and Full Sections
- Job 2 Sectional Views - The Cutting Plane
- RSA 3 Sectional Views - Half Sections
- Job 3 Sectional Views - Half Sections

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Unit VIII Sectional Views  
(Continued)

RSA	4	Sectional Views - Offset Sections, Location and Lines Behind the Cutting Plane
Job	4	Sectional Views - Offset
RSA	5	Sectional Views - Broken-Out and Revolved Sections
Job	5	Sectional Views - Broken-Out Sections
Job	6	Sectional Views - Revolved Sections
RSA	6	Removed, Auxiliary and Thin Sections
Job	7	Sectional Views - Removed Sections
Job	8	Sectional Views - Auxiliary Sections
Job	9	Sectional Drawings - Thin Sections
RSA	7	Miscellaneous Section Rules
Job	10	Sectional Views - Web or Rib Sections
Job	11	Sectional Views - Sections Through Shafts, Bolts, Bearings, etc.
Job	12-14	Sectional Views - Additional Jobs

Unit	IX	Precision Dimensioning and Tolerancing
RSA	1	Precision Dimensioning and Tolerancing - Decimal Dimensioning System
Job	1	Precision Dimensioning and Tolerancing - Decimal Dimensioning
Job	2	Precision Dimensioning and Tolerancing - Conversion Tables
RSA	2	Precision Dimensioning and Tolerancing - Basic Rules Governing Decimal Dimensioning
Job	3	Precision Dimensioning and Tolerancing - Basic Rules Governing Decimal Dimensioning
RSA	3	Precision Dimensioning and Tolerancing - Limits
Job	4	Precision Dimensioning and Tolerances
RSA	4	Precision Dimensioning and Tolerancing - Form Tolerances
Job	5	Precision Dimensioning and Tolerancing - Form Tolerances
RSA	5	Precision Dimensioning and Tolerancing - Position Tolerancing
Job	6	Precision and Limit Dimensioning - Position Tolerancing
RSA	6	Precision Dimensioning and Tolerancing - Surface Finishes

Unit	X	Screw Threads and Fasteners
RSA	1	Terminology
Job	1	Screw Threads and Fasteners - Terminology
RSA	2	Detailed Representation of American Standard V-Thread
Job	2	Screw Threads and Fasteners - Detailed Representation, American Standard V-Thread



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Unit X Screw Threads and Fasteners  
(Continued)

RSA	3	Detailed Representation of Miscellaneous Threads Square and Acme Threads
Job	3	Screw Threads and Fasteners - Square Threads
Job	4	Screw Threads and Fasteners - The Acme Thread
RSA	4	Thread Symbols - Schematic and Simplified
Job	5	Screw Threads and Fasteners - Schematic and Simplified Representation
RSA	5	Thread Series and Classes
Job	6	Screw Threads and Fasteners - Use Screw Thread Tables
RSA	6	Specifying and Dimensioning
Job	7-8	Screw Threads and Fasteners - Specifying and Dimensioning
RSA	7	Bolts, Screws, Rivets and Miscellaneous

Unit XI Gears and Cams

RSA	1	Gears and Cams - Machines Force and Motion
Math	1	Ratio
RSA	2	Gears and Cams - Gear Terminology
Math	2	Proportion
Job	1	Gears and Cams - Gear Terminology
Job	2	Gears and Cams - Construct a Spur Gear by Circular Arc Methods
RSA	3	Gears and Cams - Spur Gears
Math	3	Calculating Gear Dimensions
Job	3	Gears and Cams - Construct a Spur Gear by Circular Arc Methods
RSA	4	Gears and Cams - Rack Gear
Math	4	Calculating Gear Dimensions
Job	4	Gears and Cams - Construct a Rack Gear
RSA	5	Gears and Cams - Internal, Bevel, Worm and Helical Gears
RSA	6	Gears and Cams - Cam Layout
Job	5	Gears and Cams - Lay Out A Cam

Unit XII Pictorial Drawings

RSA	1	Pictorial Drawings - Types and Usage
RSA	2	Pictorial Drawings - Isometric Projection
Job	1-10	Pictorial Drawing - Construct an Isometric Drawing
RSA	3	Pictorial Drawing - Dimetric Drawing
Job	11-15	Pictorial Drawing - Construct A Dimetric Drawing
RSA	4	Pictorial Drawing - Cavalier Drawings
Job	16	Pictorial Drawings - Construct a Cavalier Drawing
RSA	5	Pictorial Drawings - Cabinet Drawings

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Unit XII Pictorial Drawings  
(Continued)

- Job 17 Pictorial Drawing - Construct a Cabinet Drawing
- Job 18 Pictorial Drawings - Construct a General Oblique Drawing
- RSA 6 Pictorial Drawings - General Oblique
- RSA 7 Pictorial Drawing - Perspective Drawing
- Job 19 Pictorial Drawing - Construct a One-Point Perspective
- Job 20 Pictorial Drawing - Construct a Two-Point Perspective

Unit XIII Technical Sketching

- RSA 1 Technical Sketching - Application and Technique
- Job 1-4 Technical Sketching - Sketch Straight Lines
- RSA 2 Technical Sketching - Circles and Arcs
- Job 5-6 Technical Sketching - Sketching Circles and Arcs
- Job 7 Technical Sketching - Sketch Elliptical Shapes
- Job 8 Technical Sketching - Sketch an Irregular Curve
- RSA 3 Technical Sketching - Pictorial Sketching
- Job 9-11 Technical Sketching - Isometric Sketching
- Job 12 Technical Sketching - Oblique Sketching
- Job 13 Technical Sketching - Cabinet Sketching
- Job 14 Technical Sketching - Sketch a One-Point Perspective
- Job 15 Technical Sketching - Sketch a Two Point Perspective

Unit XIV Welding Drawings

- RSA 1 Welding Drawings - Welding Processes - Arc Welding
- Job 1 Welding Drawings
- RSA 2 Welding Drawings - Resistance Welding
- Job 2 Welding Drawings - Resistance Projection Weld Symbols
- Job 3-4 Welding Drawings - Resistance Projection Weld Symbols
- Job 5 Welding Drawings - Resistance - Seam Welding Symbols
- Job 6 Welding Drawings - Flash and Upset Welding Symbols
- RSA 3 Welding Drawings - Welding Applications
- Job 7 Welding Drawings - Symbols for Built up Surfaces
- Job 8 Welding Drawings - Fillet Welding Symbols
- Job 9 Welding Drawings - Intermittent Welding Symbols
- Job 10 Welding Drawings - Location and Extent of Fillet Welds
- Job 11 Welding Drawings - Groove Welds
- Job 12 Welding Drawings - Size and Root Penetration of Welds



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Unit	XV	Architectural Drawings
	RSA	1 Architectural Drawings - Reading Architectural Drawings
	RSA	2 Architectural Drawings - Elements of Construction Drawings - Preliminary Planning
	Job	1 Architectural Drawing - Preliminary Planning
	RSA	3 Architectural Drawing - Wood Frame Floor Plans and Symbols
	Job	2 Architectural Drawing - Wood Frame Floor Plans and Symbols
	RSA	4 Architectural Drawing - Foundation Plans
	Job	3 Architectural Drawing - Foundation Plans
	RSA	5 Architectural Drawing - Brick Veneer Floor Plans and Architectural Symbols
	Job	4 Architectural Drawing - Brick Veneer Floor Plans
	RSA	6 Architectural Drawing - Wall and Roof Sections
	Job	5 Architectural Drawing - Wall and Roof Sections
	RSA	7 Architectural Drawing - Window and Door Details and Schedules
	Job	6 Architectural Drawing - Detail a Double Hung Window in Wood Frame
	Job	7 Architectural Drawing - Detail a D. H. Window in Brick Veneer
	Job	8 Architectural Drawing - Detail a Door in a Wood Frame
	Job	9 Architectural Drawing - Detail a Door in Brick Veneer
	RSA	8 Architectural Drawing - Elevations
	Job	10 Architectural Drawing - Elevations
	RSA	9 Architectural Drawing - Roof and Cornice Details
	Job	11 Architectural Drawing - Gable Roof
	Job	12 Architectural Drawing - Cornice Details
	Job	13 Architectural Drawing - Hip Roof
	Job	14 Architectural Drawing - Cornice Details
	RSA	10 Architectural Drawing - Stair Details
	Job	15 Architectural Drawing - Stair Section
	Job	16 Architectural Drawing - Plan View of Stairs
Unit	XVI	Plumbing and Piping Drawings
	RSA	1 Plumbing and Piping Drawings - Drainage and Waste Systems and Pipe Symbols
	Job	1 Plumbing and Piping Drawings - Use Piping Symbols
	RSA	2 Plumbing and Piping Drawings - Preparing the Drawings
	Job	2 Plumbing and Piping Drawings - Construct an Isometric Piping Diagram
Unit	XVII	Heating, Ventilating and Air Conditioning
	RSA	1 Heating, Ventilating and Air Conditioning - Heating Systems

Unit XVII Heating, Ventilating and Air Conditioning  
(Continued)

- Job 1 Heating, Ventilating and Air Conditioning -  
Prepare a Ductwork Layout
- RSA 2 Heating, Ventilating and Air Conditioning -  
Ventilating and Air Conditioning Systems
- Job 2 Heating, Ventilating and Air Conditioning

## Unit XVIII Topographical Drawing

- RSA 1 Topographical Drawing - Maps
- RSA 2 Topographical Drawing - Surveying
- Job 1 Topographical Drawing
- RSA 3 Topographical Drawing - Use and Interpretation  
of Title Certificates
- Job 2 Topographical Drawing - Plotting from Title  
Certificate
- RSA 4 Topographical Drawing - Interpretation of  
Field Notes
- Job 3-8 Topographical Drawing - Plotting from Field  
Notes
- RSA 5 Topographical Drawing - Profiles and Cross  
Sections
- Job 9 Topographical Drawing - Plotting a Profile  
from Field Notes
- RSA 6 Topographical Drawing - Contour Lines
- Math 1 Using Decimal Equivalents of One Foot
- Job 10 Topographical Drawing - Prepare a Contour Map  
from Field Notes
- RSA 7 Topographical Drawing - Interpretation of Aerial  
Photographs
- RSA 8 Topographical Drawing - Property Plats,  
Coordinates and Acreage Calculations
- RSA 9 Topographical Drawing - Permit Drawings
- Math 2A Trigonometry - Right-Angled Triangles
- Math 2B Trigonometry
- Math 2C Trigonometry
- Math 2D Trigonometry
- Math 2E Trigonometry
- Math 2F Trigonometry - Oblique Triangles
- Math 2G Trigonometry - Oblique Triangles
- Math 2H Trigonometry - Oblique Triangles
- Math 2I Trigonometry - Oblique Triangles
- Math 2J Trigonometry - Oblique Triangles
- RSA 10 Topographical Drawing - Land Survey Drawings

## Unit XIX Structural Steel (Tentative)

- RSA 1 The Structural Steel Frame - Present and  
illustrate the steel framing system, structural  
steel shapes, and the relationship between  
design drawings and shop fabrication details
- Math 1 Calculate weights of steel shapes given

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Unit XIX Structural Steel (Tentative)  
(Continued)

- |      |   |  |
|------|---|--|
| Job  | 1 | Indicate all dimensions of sectional structural steel shapes presented; given - pictorial sections with size and detailed dimensions in table form |
| RSA  | 2 | Erection and Shipping Marks - Present and illustrate   |
| Math | 2 | Calculate weights of steel shapes given  |
| Job  | 2 | Provide shipping and erection marks for the steel members shown; given - plan and elevation of design and drawings for a multi-story building      |
| RSA  | 3 | Dimensioning Structural Steel Details - Present and illustrate how these dimensions vary from architectural practice                               |
| Math | 3 | Practice common scales used; calculate dimensions; calculate total tonnage   |
| Job  | 3 | Provide the missing dimensions on the shop details provided; given - shop details; structural steel tables   |
| RSA  | 4 | Beam Connections - Present and illustrate the types of connections and the standardization into six series   |
| Math | 4 | Prepare an itemized bill of material for Job 3 this unit   |
| Job  | 4 | Detail 18 beams for the second floor; given - set of design drawings; structural steel tables  |
| RSA  | 5 | Column Detailing - Present and illustrate the components necessary for complete column detailing   |
| Math | 5 | Calculate the individual weights of the beams detailed in Job 5  |
| Job  | 5 | Detail 36 columns for two tiers given - set of design drawings used for previous jobs; structural steel tables                                     |
| RSA  | 6 | Detailing Members of the Bracing Unit - Present and illustrate   |
| Math | 6 | Calculate angles and legs of triangles; review of basic trigonometry; use of tables; calculate weights of columns in Job 5                         |
| Job  | 6 | Detail all bracing; given - set of design drawings used in previous jobs; structural steel tables  |
| RSA  | 7 | Detailing Trusses - Present and illustrate the various types of trusses and relationship between design and shop details                           |
| Math | 7 | Calculate weights of the structural steel used in Job 6; review trigonometry   |
| Job  | 7 | Detail all trusses; given - set of design drawings used in previous jobs; structural steel tables  |
| RSA  | 8 | Miscellaneous Iron Details - Present and illustrate the difference between structural steel frames and miscellaneous iron                          |

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Unit XIX Structural Steel (Tentative)  
(Continued)

Math	8	Calculate weights of trusses in Job 7
Job	8	Detail all miscellaneous iron indicated given - design drawings used in previous jobs; structural steel tables; architectural details required

Unit	XX	Intersections and Developments
RSA	1	Intersections and Developments - Truncated Prisms
Job	1	Intersections and Developments - Develop a Truncated Prism
RSA	2	Intersections and Developments - Right Cylinders
Job	2	Intersections and Developments - Develop a Right Cylinder
RSA	3	Intersections and Developments - Right Pyramids
Job	3	Intersections and Developments - Develop a Right Pyramid
RSA	4	Intersections and Developments - True-Length Diagrams
Job	4	Intersections and Developments - Develop an Oblique Cone
RSA	5	Intersections and Developments - Truncated Cones
Job	5	Intersections and Developments - Truncated Cone
RSA	6	Intersections and Developments - Transition Pieces
Job	6	Intersections and Developments - Develop a Transition Piece
RSA	7	Intersections and Developments - Surfaces of Spheres
Job	7	Intersections and Developments - Develop the Surface of a Sphere
RSA	8	Intersections and Developments - Elbow on Development
Job	8	Intersections and Development - Develop a Three-Piece Elbow
RSA	9	Intersections and Developments - Intersection of Prisms
Job	9	Intersections and Developments - Develop Intersecting Prisms
RSA	10	Intersections and Developments - Cylindrical Intersection
Job	10	Intersections and Developments - Develop Intersecting Cylinders
RSA	11	Intersections and Developments
Job	11	Intersections and Developments - Develop an Intersecting Prism and Cylinder
RSA	12	Intersections and Developments - Intersection of a Cylinder and a Cone

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Unit XX Structural Steel (Tentative)  
(Continued)

Job 12 Intersections and Developments - Develop an  
Intersecting Cylinder and Cone

Unit XXI Engineering Charts and Graphs  
RSA 1 Engineering Charts and Graphs - Rectangular  
Grid Systems  
Job 1 Engineering Charts and Graphs  
Job 2 Engineering Charts and Graphs - Construct a  
Profile Graph  
Job 3 Engineering Charts and Graphs - Construct a  
Multiple-Curve Graph  
RSA 2 Engineering Charts and Graphs - Rectilinear  
and Logarithmic Charts  
Job 4 Engineering Charts and Graphs - Construct a  
Rectilinear Chart - Time Series  
RSA 3 Engineering Charts and Graphs - Display  
Charts - Bar Charts  
Job 5 Engineering Charts and Graphs - Construct a  
Bar Chart  
Job 6 Engineering Charts and Graphs - Construct a  
Bar Chart  
Job 7 Engineering Charts and Graphs - Construct a  
Bar Chart  
RSA 4 Engineering Charts and Graphs - Circle Graphs  
Job 8 Engineering Charts and Graphs - Construct a  
Pie Chart  
Job 9 Engineering Charts and Graphs - Construct a  
Pie Chart  
RSA 5 Engineering Charts and Graphs - Pictorial Charts  
Job 10 Engineering Charts and Graphs - Construct a  
Pictorial Chart  
RSA 6 Engineering Charts and Graphs - Organization and  
Flow Charts  
Job 11 Engineering Charts and Graphs - Construct an  
Organization Chart  
Job 12 Engineering Charts and Graphs - Construct a  
Flow Chart  
RSA 7 Engineering Charts and Graphs  
Job 13 Engineering Charts and Graphs - Use a Graph to  
Change Feet Per Second To Miles Per Hour  
Job 14 Engineering Charts and Graphs - Use Graphs to  
Determine Horsepower  
Job 15 Engineering Charts and Graphs - Use Graphs to  
Determine Time Elements and Contour Lines

Unit XXII Reproduction Processes  
RSA 1 Reproduction Processes



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The Watchmaking Technology Course was published in 1964-65 and is available in book form for the instructors and in loose form for students. It is composed of thirty-three units.

The references for the Watchmaking Technology Course are listed below.

Title	Source
Fried, Henry B. THE WATCH REPAIRER'S MANUAL 2nd Edition	D. Van Nostrand Co., Inc. 120 Alexander Street Princeton, New Jersey
ABC'S OF HAND TOOLS	General Motors Corporation Detroit, Michigan
BULOVA WATCH REPAIR MANUAL 3rd Edition	Bulova School of Watchmaking Bulova Park Flushing 70, New York
Olivo, Thomas C. and Payne, Albert V. BASIC BLUEPRINT AND SKETCHING	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
Hood, Grant MODERN METHODS IN HOROLOGY	Bradley Polytechnic Institute Peoria, Illinois
DeCarle, Donald WITH THE WATCHMAKER AT THE BENCH	Sir Isaac Pitman & Sons, Ltd. London
Goodrich, Ward THE WATCHMAKER'S LATHE	North American Watch Tool and Supply Co. Chicago, Illinois
Levin, Louis, and Levin, Samuel PRACTICAL BENCHWORK FOR HOROLOGISTS 6th Edition	Louis Levin & Son Los Angeles, California
Milham, Willis TIME AND TIMEKEEPERS	The Macmillan Company Sixty Fifth Avenue New York 44, New York

A detailed outline of the Watchmaking Technology Course follows.

Unit I Rules and Regulations (Tentative)

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Course Outline (Continued)

Unit II Prepare Hand Tools

- RSA 1
- Job 1 Make a Regular 3/16 Graver
- Job 2 Make a Lorenge 3/16 Graver
- Job 3 Make a Regular 1/8 Graver
- Job 4 Make a Lorenze 1/8 Graver
- Job 5 Make a Round-End Graver (Small rounding)
- Job 6 Make a Squaring Graver
- Job 7 Make a Parting Tool
- Job 8 Make a Round-End Graver (Large rounding)
- Job 9 Make a Pivot Burnisher
- Job 10 Make a General Purpose Burnisher

Unit III Heat Treatment of Steel (Hardening and Tempering)

- RSA 1
- Job 1 Harden Six Pieces of Steel Rod, Different Sizes
- Job 2 Harden Gravers
- Job 3 Harden Burnishers
- RSA 2
- Job 4 Temper the Six Pieces of Drill Rod, Hardened in Job 1
- Job 5 Temper Gravers

Unit IV Finish Hand Tools

- RSA 1
- Job 1 Make Handles for Tools Made in Unit II
- Job 2 Sharpen and Polish Hand Tools Made in Unit II

Unit V Sawing and Filing

- RSA 1
- Job 1 File a Tapered Pin
- Job 2 Make a Spatula
- Job 3 Make a Pallet Warmer
- Job 4 Make Two Beat Tools
- Job 5 Make Two Beat Tools
- Job 6 Make a Polishing Shovel

Unit VI Lathe Turning

- RSA 1
- Job 1 Disassemble, Clean, and Reassemble Lathe
- Job 2 Make a Stepped Section
- Job 3 Make Two Single Tapers
- Job 4 Make Connecting Tapers
- Job 5 Make Divided Sections
- Job 6 Make Three Connected Balls

Unit VII Lathe Turning and Drilling

- RSA 1
- Job 1 Make a Flat-Nose Punch



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Unit VII Lathe Turning and Drilling (Continued)

- Job 2 Make a Round-Nosed Punch
- Job 3 Make a Centering Punch
- Job 4 Make a Center Punch
- Job 5 Make a Screw Extracting Punch
- Job 6 Make a Taper Mouth Punch
- Job 7 Cut Eight Perfect Centers
- Job 8 Make Two Double-End Jewel Pushers
- Job 9 Make a Conical Pivot
- Job 10 Make a Large Balance Staff (Brass)
- Job 11 Make a Large Balance Staff (Steel)
- Job 12 Make a Large Stem
- Job 13 Make a Small Stem
- Job 14 Make a Bushing
- Job 15 Make a Case Screw
- Job 16 Make a Balance-Cock Screw
- Job 17 Make a Small Plate Screw
- Job 18 Make a 16 Size Balance Staff
- Job 19 Make a 12 Size Balance Staff
- Job 20 Make a Screw Plate
- Job 21 Make Four Screws for the Screw Plate
- Job 22 Make a Balance Tack

Unit VIII Drills and Taps

- RSA 1
- Job 1 Make a Flat Drill 1.80mm
- Job 1 Make a Flat Drill 1.60mm
- Job 3 Make a Flat Drill 1.50mm
- Job 4 Make a Flat Drill 1.30mm
- Job 5 Make a Flat Drill 1.10mm
- Job 6 Make a Flat Drill 1.00mm
- RSA 2
- Job 7 Make a Tap 3.00mm
- Job 8 Make a Tap 1.60mm
- Job 9 Make a Tap 2.30mm
- Job 10 Make a Tap 2.00mm
- Job 11 Make a Tap 1.70mm

Unit IX Alarm Clocks (Tentative)

- RSA 1
- Job 1 Remove Clock Movements From Cases
- Job 2 Remove and Replace Clock Hands
- Job 3 Remove and Replace Balance Assembly
- Job 4 Center and Level Hairspring
- Job 5 Adjust Alarm Mechanism
- Job 6 Remove and Replace Main Spring
- Job 7 Disassemble and Reassemble Clock
- Job 8 Clean a Clock
- Job 9 Polish Clock Pivots
- Job 10 Make and Replace Balance Bushing

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Unit IX Alarm Clocks (Tentative)  
(Continued)

- Job 11 Make and Replace Balance Staff
- Job 12 Close Pivot Holes
- Job 13 Rebush Pivot Holes
- Job 14 Replace Pallet Pins
- Job 15 Replace Cannon Pinion
- Job 16 Check Depthing of Wheels
- Job 17 Straighten and Level Bent Wheels
- Job 18 Adjust and Rate Three Clocks

Unit X Pendulum Clocks

- RSA 1
- Job 1 Adjust Striking Mechanism
- Job 2 Replace Pendulum Spring
- Job 3 Adjust Lock and Slide
- Job 4 Disassemble and Assemble Pendulum Clock
- Job 5 Replace Mainspring
- Job 6 Adjust and Rate a Pendulum Clock

Unit XI Preparation for Pivoting

- RSA 1
- Job 1 Make Ten Pivot Drills
- Job 2 Harden and Temper Pivot Drills
- Job 3 Sharpen Pivot Drills

Unit XII Pivoting

- RSA 1
- Job 1 Make a Square-Shouldered Pivot
- Job 2 Pivot Steel Stock
- Job 3 Repivot Two Clock Wheels
- Job 4 Repivot 16 Size Center Wheel
- Job 5 Repivot 16 Size Third Wheel
- Job 6 Repivot 16 Size Fourth Wheel

Unit XIII Hairsprings

- RSA 1
- Job 1 Pin Ten Hairsprings into Studs
- Job 2 Pin Ten Hairsprings into Collets
- Job 3 True Hairsprings in Round
- Job 4 True Hairsprings in Flat
- Job 5 Vibrate Hairspring to Wheel

Unit XIV Jeweling Tools and Jewel Setting

- RSA 1
- Job 1 Make a Jewel Graver
- Job 2 Make a Jewel Burnisher
- Job 3 Make a Jewel Stripper
- Job 4 Set Five Burnished in Cap Jewels
- Job 5 Set Five Burnished in Balance Hole Jewels
- Job 6 Set Six Burnished in Jewels into Brass Plate

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Unit XIV Jeweling Tools and Jewel Setting  
(Continued)

- Job 7 Set Three Friction Cap Jewels into Bushings
- Job 8 Set Three Friction Balance Hole Jewels into Bushings
- Job 9 Set Six Friction Jewels into Brass Plate
- Job 10 Remove and Replace Jewels in Watch Plates

Unit XV Staffing

- RSA 1
- Job 1 Staff Six Balance Wheels, With Rivet Type Staff
- Job 2 Staff Two Balance Wheels, Friction Type Staff
- Job 3 Remove Two Standard Riveted Staffs From Wheels
- Job 4 Remove Friction Staffs From Wheels
- Job 5 Remove Side and Top Groove Staffs

Unit XVI Truing and Poising

- RSA 1
- Job 1 True Six Balance Wheels
- Job 2 Poise Six Balance Wheels
- Job 3 Make a Staff for 16 Size Balance Wheel, True and Poise

Unit XVII Pocket Watches

- RSA 1
- Job 1 Remove and Replace Hands
- Job 2 Remove and Replace Dial
- Job 3 Remove and Replace Elgin Balance Assembly
- Job 4 Remove and Replace Hamilton Balance Assembly
- Job 5 Remove and Replace Waltham Balance Assembly
- Job 6 Disassemble and Reassemble 16 Size Watch Movements
- Job 7 Make a Hairspring-Collet Removing Tool
- Job 8 Remove and Replace Hamilton, Elgin, and Waltham Hairsprings.
- Job 9 Remove and Replace all Types of Roller Tables
- Job 10 Replace Roller Jewels
- RSA 2
- Job 11 Replace Balance Cock Jewels
- Job 12 Measuring, Selecting, and Fitting Balance Staff
- Job 13 Restaff Hamilton Balance Wheel
- Job 14 Restaff Elgin Balance Wheel
- Job 15 Restaff Waltham Balance Wheel
- Job 16 Replace Elgin Mainspring
- Job 17 Replace Hamilton Mainspring
- Job 18 Replace Waltham Mainspring
- Job 19 Check and Adjust End and Side Shake in Time Train
- Job 20 Straighten bent Wheels
- Job 21 Install Two Jewels on Escape Wheel

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Unit XVII Pocket Watches  
(Continued)

- Job 22 Replace Center Hole Jewel
- Job 23 Check Depthing
- Job 24 Close Holes on Time Train
- Job 25 Replace Minute Wheel Post
- Job 26 Tighten Elgin Cannon Pinion
- Job 27 True Bent Center Posts
- Job 28 Replace Wheel in Hamilton Dial Train
- Job 29 Alter Screws from an Assortment, to Fit into Watch
- Job 30 Make and Replace Three Click Springs
- Job 31 Make and Replace Winding Arbor (using sample)
- Job 32 Make and Replace Winding Arbor (without sample)
- Job 33 Replace Broken Regulator Pins
- Job 34 Remove Rusty Screws
- Job 35 Remove Broken Screws
- Job 36 Straighten Bent Pivots
- Job 37 Make and Replace Broken Detent Screw
- Job 38 Make Hamilton Pallet Arbor
- Job 39 Replace Broken Pallet Arbors
- Job 40 Fit New Pair or Hands to Watch
- Job 41 Convert Seven Jewel Watch to Fifteen Jewel Watch
- Job 42 Disassemble, Clean, Oil and Reassemble Pocket Watch
- Job 43 Repair Test Watch and Enter into Log
- Job 44 Estimate Work on Test Watches

Unit XVIII Escapement

- RSA 1
- Job 1 Manipulate Model Escapement
- Job 2 Remove and Replace Pallet Stones
- Job 3 Make Escapement Checks on 16 Size Hamilton
- Job 4 Match Escapement on 16 Size Hamilton
- Job 5 Match Escapement on 16 Size Elgin

Unit XIX Electric Clocks

- RSA 1
- Job 1 Adjust Alarm Mechanism
- Job 2 Disassemble and Reassemble Clock
- Job 3 Replace Motor
- Job 4 Check and Replace Coil
- Job 5 Clean and Oil Electric Clock

Unit XX Crystal Fitting

- RSA 1
- Job 1 Fit Crystal to 16 Size Watch
- Job 2 Fit Crystal to 12 Size Watch
- Job 3 Fit Crystal to 6/0 Size Watch

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Unit XX Crystal Fitting  
(Continued)

- Job 4 Fit Crystal to 10/0 Size Watch
- Job 5 Fit Crystal to 10 1/2 Ligne Watch
- Job 6 Fit Fancy Crystal to 10 1/2 Ligne Watch
- Job 7 Fit Fancy Crystal to 8 3/4 Ligne Watch
- Job 8 Fit Fancy Crystal to 6 3/4 Ligne Watch
- Job 9 Fit Fancy Crystal to 5 Ligne Watch
- Job 10 Replace Round, Waterproof Crystals, With  
Crystal Inserters
- Job 11 Replace Crystals in Elgin, Wyler, Gruin With  
the Use of the Number System
- Job 12 Grind "Near Fit" Crystals to Fit Bezels

Unit XXI Shaping Overcoils

- RSA 1
- Job 1 Form Four Overcoils, Using Gradual Bend Method
- Job 2 Form Four Overcoils, Using Knee Bend Method
- Job 3 Vibrate Hairspring and Form Overcoils for Two  
Pocket Watches

Unit XXII Polishing Machine

- RSA 1
- Job 1 Polish 16 Size Silver Case
- Job 2 Polish 16 Size White Gold Case
- Job 3 Polish 16 Size Yellow Gold Case
- Job 4 Polish 16 Size Yellow Gold Filled Case
- Job 5 Polish 10 Ligne Stainless Steel Case
- Job 6 Polish 6 3/4 Ligne Gold Filled Case
- Job 7 Polish Plastic Watch Crystals
- Job 8 Polish Pocket Watch Chain

Unit XXIII Chronometer Watches and Marine Chronometers

- RSA 1
- Job 1 Disassemble, Clean, Oil, and Reassemble 22 Size  
Hamilton Chronometer Watch
- Job 2 Disassemble, Clean, Oil and Reassemble 36 Size  
Waltham Chronometer Watch
- Job 3 Disassemble, Clean, Oil, and Reassemble 18 Size  
Elgin Chronometer Watch
- Job 4 Adjust and Rate Elgin, Hamilton, and Waltham  
Chronometer Watches
- RSA 2
- Job 5 Disassemble, Clean, Oil, and Reassemble a  
Marine Chronometer
- Job 6 Adjust and Rate a Marine Chronometer

Unit XXIV Material Cabinets and Systems

- RSA 1
- Job 1 Fingerprint a Swiss Watch
- Job 2 Identify and Obtain Replacement Parts for  
Practice Movements

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Unit XXV Wrist Watches

- Job 1 Disassemble, Clean, Oil and Reassemble 10 1/2 Ligne Wrist Watch
- Job 2 Replace Mainspring in Wrist Watch
- Job 3 Tighten Cannon Pinion
- Job 4 Replace Stem
- Job 5 Make and Install Click and Clutch Spring
- Job 6 Replace Balance Hole Jewels
- Job 7 Replace Pallet Bridge Jewel
- Job 8 Make and Install Pallet Arbor
- Job 9 Replace Six Pallet Arbors in Swiss and American Watch Movements
- Job 10 Replace Pallet Stones and Adjust Lock
- Job 11 Install Four Roller Jewels
- Job 12 Staff 10 1/2 Ligne Watch
- Job 13 Staff 8 3/4 Ligne Watch
- Job 14 Staff 6 3/4 Ligne Watch
- Job 15 Staff 5 Ligne Watch
- Job 16 Make a Stem to Fit a 10 1/2 Ligne Watch Without the Use of a Sample
- Job 17 Replace Banking Pins
- Job 18 Overhaul Rusty Movement
- Job 19 Polish Pivots in 6 3/4 Ligne Watch
- Job 20 Replace Regulator Pins and Boots
- Job 21 Replace Broken Guard Finger
- Job 22 Repair Test Watch and Enter into Log Book

Unit XXVI Self-Winding Watches

- RSA 1
- Job 1 Dismantle and Reassemble a Self-Winding Watch
- Job 2 Replace Broken Oscillating Weight Axle
- Job 3 Replace Driving Gear Arbor
- Job 4 Replace Oscillating Weight Bushings and Jewels
- Job 5 Make and Replace Stop Click Spring
- Job 6 Replace Broken Mainspring
- Job 7 Replace Broken Slip Spring
- Job 8 Adjust Side Shake in Oscillating Weight Bushing
- Job 9 Clean, Oil, and Adjust Four Self-Winding Watches

Unit XXVII Complicated Watches

- RSA 1
- Job 1 Disassemble and Reassemble Two Calendar Watches
- Job 2 Disassemble, Clean, Oil, and Adjust Calendar Wrist Watch
- RSA 2
- Job 3 Disassemble and Reassemble a Wrist Alarm Watch
- Job 4 Disassemble, Clean, Oil, and Adjust Wrist Alarm
- RSA 3
- Job 5 Disassemble and Reassemble, in Stages, a Chronograph Wrist Watch
- Job 6 Adjust Meshing of Gears for the Sweep Second Hand



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Unit XXVII Complicated Watches  
(Continued)

- Job 7 Adjust Minute Counter
- Job 8 Adjust Rate With Timer Mechanism Engaged and  
Timer Mechanism Disengaged
- Job 9 Adjust Fly-Back Mechanism

Unit XXVIII Waterproofing Watches

- RSA 1
- Job 1 Test Four Watches Using Air Pressure Principle
- Job 2 Replace Leaky Crystal and Secure it Airtight
- Job 3 Replace Four Case Pipes and Test for  
Waterproofness
- Job 4 Replace Leaky Crowns on Practice Watches
- Job 5 Replace Case Back, Gaskets and Test
- Job 6 Waterproof Watch With One Piece Case

Unit XXIX Adjusting to Positions

- RSA 1
- Job 1 Adjust 16 Size Elgin to 3 Positions
- Job 2 Adjust 16 Size Hamilton to 3 Positions
- Job 3 Adjust American Wrist Watch to 3 Positions
- Job 4 Adjust Swiss Wrist Watch to 3 Positions
- Job 5 Adjust 16 Size Elgin (R.R.) to 5 Positions
- Job 6 Adjust 16 Size Hamilton R.R.) to 5 Positions

Unit XXX Electric Wrist Watches

- RSA 1
- Job 1 Disassemble and Reassemble Electric Watches  
(three)
- Job 2 Clean 3 Electric Watches
- Job 3 Replace Energy Cells in Electric Watches
- Job 4 Check the Coil in a Electric Watch
- Job 5 Adjust Contact Points
- Job 6 Adjust Trip Spring
- Job 7 Adjust and Rate Three Electric Watches
- Job 8 Adjust Shake in Electric Watches

Unit XXXII. Electronic Wrist Watches

Unit XXXIII. General Watch Repair

FINAL TEST

- Written Test (Theory)
- Practical Test (Bench Work)



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The Welding Jobs, Instructor's Guides and Tests were published in 1958 and revised in 1963. Each Job contains Related Study Assignments and when necessary, math and technical information. The Welding Course Mathematics was published in 1952. The Welding Course is available in the following forms:

Jobs and Tests are available in loose form for the students.  
Job and Test Books are available for the instructors.

Book I - Units I and II  
Book II - Units III and IV  
Mathematics (Welding Course Math)  
Blueprint Reading and Sketching (From Oklahoma A and M  
College reprinted by the Lab.)

Test Book I - Units I, II, III and IV  
Answer Book - Units I, II, III and IV

The following instructor's aids are available:  
Permanent Record Folder  
Wall Progress Chart

The References for the Welding Course are the following:

Title	Source
Potter OXYACETYLENE WELDING	American Technical Society 848 East 58th Street Chicago 37, Illinois
Bennett and Siy BLUEPRINT READING FOR WELDERS	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
WELDING COURSE MATHEMATICS	Louisiana State Voc.-Tech. Curriculum Laboratory P. O. Box 657 Natchitoches, Louisiana
Althouse-Turnquist MODERN WELDING PRACTICE	The Goodheart-Willcox Co., Inc. 1322 South Wabash Avenue Chicago 5, Illinois
THE OXYACETYLENE HANDBOOK	The Linde Company 270 Park Avenue New York 17, New York

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References (Continued)

Title	Source
OXYACETYLENE WELDING AND CUTTING	Air Reduction Sales Co., Inc. Div. of Air Reduction Co., Inc. 2507 Larkspur Street Baton Rouge, Louisiana
	Air Reduction Sales Co., Inc. Div. of Air Reduction Co., Inc. 6031 St. Vincent Avenue Shreveport, Louisiana
	Air Reduction Salse Co., Inc. Div. of Air Reduction Co., Inc. 1406 S. Rendon New Orleans 75, Louisiana
Sacks THEORY AND PRACTICE OF ARC WELDING	D. Van Nostrand Co., Inc. 120 Alexander Street Princeton, New Jersey
NEW LESSONS IN ARC WELDING	Lincoln Electric Co. 22801 St. Clair Avenue Cleveland 17, Ohio
Roden and Griffin BASIC ARC WELDING	Delmar Publishers Inc. Mountainview Avenue Albany 5, New York
Blodgett-Scalzi DESIGN OF WELDED STRUCTURAL CONNECTIONS	Lincoln Electric Co. 22801 St. Clair Avenue Cleveland 17, Ohio
Frankland, PIPE FITTER'S AND PIPE WELDER'S HANDBOOK	The Bruce Publishing Co. 400 North Broadway Milwaukee 1, Wisconsin
FABRICATION OF OXY-ACETYLENE WELDED STEEL AND WROUGHT IRON PIPING	The Linde Company 270 Park Avenue New York 17, New York

A detailed outline of the Welding Course follows:

UNIT I - WELDING - OXYACETYLENE CUTTING

Job	1	Set Up Oxyacetylene Equipment (Flat)
Job	2	To Cut Steel Plate (Flat)
Job	3	Cutting Odd Shapes (Flat)
Job	4	To Pierce Steel Plate (Flat)
Job	5	Manipulative Test (Flat)

Course Outline (Continued)

UNIT II - WELDING - OXYACETYLENE WELDING

- |     |    |                                     |
|-----|----|-------------------------------------|
| Job | 1  | Deposit Beads                       |
| Job | 2  | Welding with Filler Rod             |
| Job | 3  | Corner Joint                        |
| Job | 4  | Butt Weld Mild Steel                |
| Job | 5  | Lap Weld Mild Steel                 |
| Job | 6  | Manipulative Test                   |
| Job | 7  | Butt Weld                           |
| Job | 8  | Lap Joint                           |
| Job | 9  | Vee-Butt Joint                      |
| Job | 10 | Butt Joint                          |
| Job | 11 | Lap Joint                           |
| Job | 12 | Manipulative Test                   |
| Job | 13 | Bronze Weld Mild Steel              |
| Job | 14 | Braze-Weld Cast Iron                |
| Job | 15 | Silver Solder a Lap Joint of Copper |
| Job | 16 | Manipulative Test                   |
| Job | 17 | Butt Weld Pipe (Roll)               |
| Job | 18 | Butt Weld Pipe (Bell Hold)          |
| Job | 19 | Butt Weld Pipe                      |
| Job | 20 | Manipulative Test                   |

UNIT III - WELDING - ARC WELDING

- |     |    |   |
|-----|----|---|
| Job | 1  | Stringer Beads (Flat)                     |
| Job | 2  | Weave Beads (Flat)                        |
| Job | 3  | Edge Joint (Flat)                         |
| Job | 4  | Tee Joint (Flat)                          |
| Job | 5  | Outside Corner Joint (Flat)               |
| Job | 6  | V-Butt Joint - Back up Strip (Flat)       |
| Job | 7  | V-Butt Joint - Open (Flat)                |
| Job | 8  | Manipulative Test                         |
| Job | 9  | Stringer Beads (Horizontal)               |
| Job | 10 | Lap Joint (Horizontal)                    |
| Job | 11 | Tee Joint - Stringer Beads (Horizontal)   |
| Job | 12 | Tee Joint - Weave Beads (Horizontal)      |
| Job | 13 | V-Butt Joint - Back up Strip (Horizontal) |
| Job | 14 | V-Butt (Open) (Horizontal)                |
| Job | 15 | Manipulative Test                         |
| Job | 16 | Stringer Beads (Travel down) (Vertical)   |
| Job | 17 | Lap Joint (Travel down) (Vertical)        |
| Job | 18 | Stringer Beads (Travel up) (Vertical)     |
| Job | 19 | Weave Beads (Travel up) (Vertical)        |
| Job | 20 | Lap Joint (Travel up) (Vertical)          |
| Job | 21 | Tee Joint (Travel up) (Vertical)          |
| Job | 22 | Corner Joint (Travel up) (Vertical)       |

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UNIT III - WELDING - ARC WELDING

- Job 23 V-Butt Joint (Back up strip, travel up) (Vertical)
- Job 24 V-Butt Joint (Open) (Vertical)
- Job 25 Manipulative Test
- Job 26 Stringer Bead (Overhead)
- Job 27 Weave Beads (Overhead)
- Job 28 Lap Joint (Overhead)
- Job 29 Tee Joint (Overhead)
- Job 30 V-Butt Joint (Back up strip) (Overhead)
- Job 31 V-Butt Joint (Open) (Overhead)
- Job 32 Manipulative Test
- Job 33 Roll Weld Pipe
- Job 34 Butt Weld Pipe
- Job 35 Butt Weld Pipe
- Job 36 Orange Peel
- Job 37 Lay Out 6" Branch for 6" Header
- Job 38 Reducing Lateral
- Job 39 Concentric Reducer
- Job 40 Fabricate Piping Offset
- Job 41 Weld Flange on Pipe

UNIT IV - INERT GAS WELDING

- Job 1 Stringer Beads without Filler Rod
- Job 2 Stringer Beads Using Filler Rod
- Job 3 Tee Joint on Aluminum
- Job 4 Butt Joint on Aluminum Plate
- Job 5 Butt Weld Pipe (Roll Weld)

CARPENTRY  
Apprentice

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This course was written in 1950 and revised in 1960. There are X units available in the following book form.

Book I - Unit I Related Study Assignments  
Book II - Unit II Related Study Assignments  
Book III - Unit III Related Study Assignments  
Book IV - Unit IV Related Study Assignments  
Book V - Units V & VI Related Study Assignments  
Book VI - Units VII & VIII Related Study Assignments  
Book VII - Units IX & X Related Study Assignments

Test Book I - Unit I	Test Book V - Units V & VI
Test Book II - Unit II	Test Book VI - Units VII & VIII
Test Book III - Unit III	Test Book VII - Units IX & X
Test Book IV - Unit IV	Answer Book - Units I-X

References for the Carpentry Apprentice Course are listed below.

Title	Source
Dalzell, Ralph J., BUILDING TRADE BLUEPRINT READING, 3rd Ed.	American Technical Society 848 East 58th Street Chicago 37, Illinois
CONCRETE FORM CONSTRUCTION	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
Wilson, J. Douglas and Rogers, Clell M., CARPENTRY MATHEMATICS, 2nd Ed.	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
FRAMING, SHEATHING AND INSULATION	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
CARPENTRY APPRENTICE TRAINING COURSE	United Brotherhood of Carpenters and Joiners of America 222 E. Michigan St. Indianapolis 4, Indiana
Wilson, J. Douglas and Werner, S. O. SIMPLIFIED ROOF FRAMING	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
INTERIOR AND EXTERIOR TRIM	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
THE USE OF HAND TOOLS AND PORTABLE MACHINERY	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York

References (Continued)

Title	Source
Wilson, J. Douglas and Roger, Clell M., SIMPLIFIED CARPENTRY ESTIMATING	Simmons-Broadman Publishing Corp. 30 Church Street New York 7, New York

A detailed course outline is given below.

Unit I - Foundations

- R.S.A. A - Orientation for Carpentry Apprentice  
(Information Sheet)
- R.S.A. B - How to Use This Course in Related Information for  
Carpentry Apprentices (Information Sheet)
- R.S.A. 1 - Whole Numbers
- R.S.A. 2 - Fractions
- R.S.A. 3 - Measuring Tools and Their Uses
- R.S.A. 4 - Plumbing and Leveling Tools
- R.S.A. 5 - Cutting and Striking Tools
- R.S.A. 6 - Use and Care of the Hand Saw
- R.S.A. 7 - Form Lumber
- R.S.A. 8 - Form Ties
- R.S.A. 9 - Batter Boards (Information Sheet)
- R.S.A. 10 - Property Lines, Building Location, Excavation  
Lines, Diagonals (Information Sheet)
- R.S.A. 11 - How to Lay Out Building Lines
- R.S.A. 12 - How to Use Materials in Form Construction
- R.S.A. 13 - Anchor Bolts
- R.S.A. 14 - Concrete Footings and Piers
- R.S.A. 15 - Pier and Footing Form Construction
- R.S.A. 16 - Foundation Wall Forms
- R.S.A. 17 - Foundation Wall Forms (Continued) (Information  
Sheet)
- R.S.A. 18 - Openings in Concrete Walls

Unit II - Frame Construction

- R.S.A. A - Orientation for Carpenter Apprentice  
(Information Sheet)
- R.S.A. B - How To Use This Course in Related Information  
for Carpentry Apprentices (Information Sheet)
- R.S.A. 1 - The Present-Day Home and its Predecessor  
(Information Sheet)
- R.S.A. 2 - Metal Fastenings
- R.S.A. 3 - Carpentry Tools of Wood (Information Sheet)
- R.S.A. 4 - Termites and Decay (Information Sheet)
- R.S.A. 5 - Types of Frame Construction
- R.S.A. 6 - Sills
- R.S.A. 7 - Girders
- R.S.A. 8 - The Lower Frame in Louisiana (Information Sheet)
- R.S.A. 9 - Floor Joists, Herringbone Bridging



Course Outline (Continued)

- R.S.A. 10 - Subflooring
- R.S.A. 11 - Horizontal Frame Layout (Information Sheet)
- R.S.A. 12 - Vertical Frame Layout, The "Story Pole"  
(Information Sheet)
- R.S.A. 13 - Balloon Frame Layout, Corner Post, Walls, and  
Second-floor Joists (Information Sheet)

Unit III - Roof Framing

- R.S.A. A - Orientation for Carpentry Apprentice  
(Information Sheet)
- R.S.A. B - How to Use This Course in Related Information  
for Carpentry Apprentices (Information Sheet)
- R.S.A. 1 - Roofs, Past and Present (Information Sheet)
- R.S.A. 2 - Roof Types and Terms
- R.S.A. 3 - Principles of Roof Framing
- R.S.A. 4 - The Common Rafter (Information Sheet)
- R.S.A. 5 - The Hip Rafter "Length"
- R.S.A. 6 - The Hip Rafter "Cuts"
- R.S.A. 7 - The Hip Jack Rafter
- R.S.A. 8 - The Hip Jack Rafter (Continued) (Information  
Sheet)
- R.S.A. 9 - The Valley Rafter
- R.S.A. 10 - The Valley and Cripple Jacks
- R.S.A. 11 - Special Roof Framing Problems
- R.S.A. 12 - The Steel Square and Its Use
- R.S.A. 13 - Using the Tables on the Steel Square

Unit IV - Exterior Trim

- R.S.A. A - Orientation for Carpentry Apprentice  
(Information Sheet)
- R.S.A. B - How to Use This Course (Information Sheet)
- R.S.A. 1 - Description of Common Types of Cornices
- R.S.A. 2 - Mouldings (Information Sheet)
- R.S.A. 3 - How to Build Common Cornices
- R.S.A. 4 - Wood Shingles
- R.S.A. 5 - How to Lay Wood Shingles
- R.S.A. 6 - Overroofing with Shingles (Information Sheet)
- R.S.A. 7 - Composition Roof Covering
- R.S.A. 8 - Composition, Iron and Aluminum Roof Covering  
(Information Sheet)
- R.S.A. 9 - Safety (Information Sheet)
- R.S.A. 10 - Description of Window Frames
- R.S.A. 11 - How to Build and Install Window and Door  
Frame
- R.S.A. 12 - Water Tables, Corner Boards, Belt Course Types,  
and Installation
- R.S.A. 13 - Side Wall Coverings - Types, and Installation
- R.S.A. 14 - Side Wall Coverings (Continued) (Information  
Sheet)
- R.S.A. 15 - Porch Trim - Types and Application
- R.S.A. 16 - Front Entrances

Course Outline (Continued)

Unit V - Interior Trim

- R.S.A. A - Orientation for Carpentry Apprentice  
(Information Sheet)
- R.S.A. B - How to Use This Course (Information Sheet)
- R.S.A. 1 - Insulation
- R.S.A. 2 - Description of Wallboard (Information Sheet)
- R.S.A. 3 - Wallboard Application (Information Sheet)
- R.S.A. 4 - Lath
- R.S.A. 5 - Finishing Tools
- R.S.A. 6 - Finishing Tools (Continued)
- R.S.A. 7 - Finish Hardware
- R.S.A. 8 - How to fit Window Sash
- R.S.A. 9 - Window and Door Jambs and Trim
- R.S.A. 10 - Baseboards and Wall Panels
- R.S.A. 11 - Finish Hardwood Floors
- R.S.A. 12 - How to Apply Finish Hardware
- R.S.A. 13 - Millwork Installation (Information Sheet)
- R.S.A. 14 - Kitchen Cabinets, Clothes and Linen Closets,  
and Miscellaneous Millwork
- R.S.A. 15 - Current Information (Information Sheet)

Unit VI - Stairs

- R.S.A. 1 - Forms for Concrete Steps
- R.S.A. 2 - Framing a Stair Well
- R.S.A. 3 - Stairway Framing
- R.S.A. 4 - Stair Platforms
- R.S.A. 5 - Finish Stairs on Carriages and Housed and  
Open Stringers
- R.S.A. 6 - Newel Posts and Handrails
- R.S.A. 7 - The Proper Approach to Stair Stringer Layout

Unit VII - Floor Covering

- R.S.A. A - Orientation for Carpentry Apprentice  
(Information Sheet)
- R.S.A. B - How to Use This Course (Information Sheet)
- R.S.A. 1 - The Resilient Floor-Covering Products
- R.S.A. 2 - Tools for Tile Mechanics
- R.S.A. 3 - Preparing the Job for Installation of Floor  
Covering
- R.S.A. 4 - Preparing the Sub-floor
- R.S.A. 5 - Laying Sheet Goods Wall to Wall
- R.S.A. 6 - Pattern Layout
- R.S.A. 7 - Cutting, Fitting, and Laying Lining Felt and  
Resilient Tile
- R.S.A. 8 - Cabinet and Backsplash Covering
- R.S.A. 9 - Maintenance of the Tile Floors
- R.S.A. 10 - Safety

Course Outline (Continued)

Unit VIII - Miscellaneous

- R.S.A. 1 - Temporary Building (Information Sheet)
- R.S.A. 2 - Window and Door Screens (Information Sheet)
- R.S.A. 3 - Anchor Bolts for Column Bases and Machines (Information Sheet)
- R.S.A. 4 - Roof and Bridge Trusses (Information Sheet)
- R.S.A. 5 - Dimensions (Information Sheet)
- R.S.A. 6 - Estimating Fundamentals
- R.S.A. 7 - Foundation Materials
- R.S.A. 8 - Framing
- R.S.A. 9 - Framing
- R.S.A. 10 - Exterior Finish
- R.S.A. 11 - Interior Finish
- R.S.A. 12 - Estimator's Tables
- R.S.A. 13 - Estimating Short Cuts
- R.S.A. 14 - Labor Hours Per Unit
- R.S.A. 15 - The Union

Unit IX - Advanced Related Information

- R.S.A. A - Orientation for Advanced Apprentice (Information Sheet)
- R.S.A. B - How to Use This Unit in Advanced Related Information for Carpenters (Information Sheet)
- R.S.A. 1 - Forms: Concrete Work
- R.S.A. 2 - Lumber Measuring and Selecting
- R.S.A. 3 - House Framing Methods
- R.S.A. 4 - Floor, Wall Framing
- R.S.A. 5 - Roof Types Framing
- R.S.A. 6 - Exterior Wall Construction
- R.S.A. 7 - Roofing Material Installation
- R.S.A. 8 - Thermal-Sound Insulation
- R.S.A. 9 - Windows and Doors
- R.S.A. 10 - Staircase Building
- R.S.A. 11 - Interior Walls and Finishes
- R.S.A. 12 - Planning a Home

Unit X - Advanced Blueprint Reading and Estimating

- R.S.A. 1 - Blueprint Reading and Estimating
- R.S.A. 2 - Rough Framing, Exterior Finish, and Roof Framing
- R.S.A. 3 - Interior Finish
- R.S.A. 4 - Plan Reading and Estimating for Plan B
- R.S.A. 5 - Plan Reading and Estimating for Plan B
- R.S.A. 6 - Plan Reading and Estimating for Plan B
- R.S.A. 7 - Plan Reading and Estimating for Plan B
- R.S.A. 8 - Plan Reading and Estimating for Plan B
- R.S.A. 9 - Plan Reading and Estimating for Plan C

Course Outline (Continued)

Unit X (Continued)

- R.S.A. 10 - Plan Reading and Estimating for Plan C
- R.S.A. 11 - Plan Reading and Estimating for Plan C
- R.S.A. 12 - Plan Reading and Estimating for Plan C
- R.S.A. 13 - Plan Reading and Estimating for Plan C
- R.S.A. 14 - Plan Reading and Estimating for Plan C

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The Electrical Apprentice Course was published in 1952-53 and revised in 1961. It is available in the following forms:

Related Study Assignments

- Book 1 - Units 1, 2, and 3
- Book 2 - Units 4, 5, 6, 7, 8, and 9
- Book 3 - Units 10, 11, 12, and 13
- Book 4 - Units 14, 15, 16, 17, 18, 19, and 20
- Book 5 - Units 21, 22, 23, 24, 25, and Appendix

Test Books

- Book 1 - Units 1, 2, and 3
- Book 2 - Units 4, 5, 6, 7, 8, and 9
- Book 3 - Units 10, 11, 12, and 13
- Book 4 - Units 14, 15, 16, 17, 18, 19, and 20
- Book 5 - Units 21, 22, 23, 24, and 25

Answer Book

- Book 1 - Units 1 - 25

The following instructor's aids are available:

- Progress Charts
- Monthly Reports of Apprentice

The references for the Electrical Apprentice Course are the following:

Title	Source
Welton, Paul L., and Rogers, Wm. W. SHOP MATHEMATICS AT WORK	Silver Burdett Company 707 Browder Street Dallas 1, Texas
Uhl, Dunlap, and Flynn, INTERIOR ELECTRIC WIRING AND ESTIMATING - RESIDENTIAL	American Technical Society 848 East Fifty-Eighth Street Chicago 37, Illinois
Richter, H. P., PRACTICAL ELECTRICAL WIRING	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
National Board of Fire Underwriters, THE NATIONAL ELECTRICAL CODE Pamphlet # 70	National Board of Fire Underwriters 85 John Street
The American National Red Cross, FIRST AID TEXTBOOK	Doubleday and Company, Inc. Gareen City, New York
Hausmann, Erich, SWOOPE'S LESSONS IN PRACTICAL ELECTRICITY	D. Van Nostrand Company, Inc. 120 Alexander Street Princeton, New Jersey

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References (Continued)

Title	Source
Cooke, Nelson M. MATHEMATICS FOR ELECTRICIANS AND RADIOMEN	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Abbott, Arthur L. and Stetka, Frank NATIONAL ELECTRICAL CODE HANDBOOK 10th Edition, 1960	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Graham, Kennard C., NATIONAL ELECTRICAL CODE AND BLUEPRINT READING, Unit 3	American Technical Society 848 East 58th Street Chicago 37, Illinois
Kruger, Albert M., and Ferry, Trafford J., CONDUIT BENDING MANUAL, 1939	C.B.M. Publications 6555 77th Place Maspeth, New York
Crouse, William H., ELECTRICAL APPLIANCE SERVICING	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Rosenberg, Robert, ELECTRIC MOTOR REPAIR	Holt, Rinehart and Winston, Inc. 383 Madison Avenue New York 17, New York
Timbie, W. H. ELEMENTS OF ELECTRICITY 3rd Edition, 16th Printing	John Wiley & Sons, Inc. 440 Park Avenue South New York 16, New York
Rasch, William Edward PRACTICAL ELECTRICAL MATHEMATICS	D. C. Heath and Co. 285 Columbus Avenue Boston 16, Massachusetts
Gibbs, J. B. TRANSFORMER PRINCIPLES AND PRACTICES 1950 Edition	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Crow, Leonard R. LEARNING ELECTRICITY AND ELECTRONICS EXPERIMENTALLY	Educational Publishers, Inc. St. Louis 1, Missouri
Nadon, John M. and Gelmine, Bert J. INDUSTRIAL ELECTRICITY	D. Van Nostrand Co., Inc. 120 Alexander Street Princeton, New Jersey



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References (Continued)

Title	Source
Van Valkenburgh, Nooger and Neville, Inc. BASIC SYNCHROS AND SERVO- MECHANISMS	John F. Rider Publisher, Inc. 480 Canal Street New York 13, New York
GENERAL DESCRIPTION FOR D.C. VARIABLE DRIVE	Fidelity Instrument Corp. 1000 E. Boundary Avenue York, Pennsylvania
DESCRIPTION OF OPERATION AND SERVICE INSTRUCTIONS, MODEL F-29B SPEED REGULATOR	Fidelity Instrument Corp. 1000 E. Boundary Avenue York, Pennsylvania
WESTINGHOUSE LIGHTING HANDBOOK	Westinghouse Electric Corp. Lamp Division Springfield, Massachusetts

A detailed outline of the Electrical Apprentice Course follows:

BOOK I - Electrical Apprentice

Unit I - Tools, Materials, and Their Uses

- R.S.A. 1 How to Use This Course of Study (Information Sheet) No Test
- R.S.A. 2 The Apprentice and His Job (Information Sheet)
- R.S.A. 3 American Red Cross Standard First Aid Course (Information Sheet)
- R.S.A. 4 Care and Use of Hand Tools and Equipment (Information Sheet)
- R.S.A. 5 Common Fractions (Mathematics)
- R.S.A. 6 Care and Use of Power Operated Tools (Information Sheet)
- R.S.A. 7 Types of Fasteners (Information Sheet)
- R.S.A. 8 Decimal Fractions (Mathematics)
- R.S.A. 9 Introduction to the National Electrical Code
- R.S.A. 10 Types of Wires and Cable

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Course Outline (Continued)

- R.S.A. 11 Use of American Wire Gauge and the Micrometer  
(Mathematics)
- R.S.A. 12 Raceways and Fittings
- R.S.A. 13 Measurements (Mathematics)
- R.S.A. 14 Wire Connections and Soldering
- R.S.A. 15 Using Letters as Numbers (Mathematics)
- R.S.A. 16 Employer and Employee Organization (Information  
Sheet)

Unit II - Fundamental Theory of Electricity

- R.S.A. 1 Electron Theory
- R.S.A. 2 Literal Numbers, Addition and Subtraction  
(Mathematics)
- R.S.A. 3 Static Electricity (Information Sheet)
- R.S.A. 4 Multiplication and Division (Mathematics)
- R.S.A. 5 Sketching and Blueprint; Electrical  
Symbols #1 (Information Sheet)
- R.S.A. 6 Exponents, Square Root, and Units (Mathematics)
- R.S.A. 7 Electric Current and Electron Flow
- R.S.A. 8 Equations (Mathematics)
- R.S.A. 9 Voltage, Current, Resistance and Conductance  
(Information Sheet)
- R.S.A. 10 Properties of Magnets and Magnetic Fields
- R.S.A. 11 Electromagnetism
- R.S.A. 12 Means of Developing Electromotive Forces
- R.S.A. 13 Primary Cells
- R.S.A. 14 Secondary Cells

Course Outline (Continued)

Unit II (Continued)

R.S.A. 15 Ratio and Proportion (Mathematics)

R.S.A. 16 Sketching and Blueprint; Electrical Symbols #2

Unit III - Principles of Direct Current

R.S.A. 1 Ohm's Law--Series Circuits (Mathematics)

R.S.A. 2 Ohm's Law--Parallel Circuits (Mathematics)

R.S.A. 3 Ohm's Law--Series-Parallel Circuits (Mathematics)

R.S.A. 4 Power in Direct Current Circuits

R.S.A. 5 Problems Concerning Cells (Mathematics)

R.S.A. 6 Circuit Sketching, Cells in Series-Parallel

R.S.A. 7 Low Voltage Signal Circuits

R.S.A. 8 Simple Bell Circuits (Circuit Sketching)

R.S.A. 9 Fuses and Circuit Breakers

R.S.A. 10 Principles of Dynamo-Electric Machines

R.S.A. 11 Problems Concerning Conductors

BOOK II - Electrical Apprentice

Unit IV - Principles of Alternating Current

R.S.A. 1 Introduction to Trigonometry (Mathematics)

R.S.A. 2 Trigonometric Functions (Mathematics)

R.S.A. 3 Tables of Functions (Mathematics)

R.S.A. 4 Solution of Right Triangles (Mathematics)

R.S.A. 5 Periodic Functions (Mathematics)

R.S.A. 6 Elementary Plane Vectors (Mathematics)

Course Outline (Continued)

Unit IV (Continued)

- R.S.A. 7 Alternating Currents and Voltages (Information Sheet)
- R.S.A. 8 Inductance (Information Sheet)
- R.S.A. 9 Capacitance (Information Sheet)

Unit V - Alternating-Current Circuits

- R.S.A. 1 Resistance and Power in AC Circuits (Information Sheet)
- R.S.A. 2 Inductance in AC Circuits (Information Sheet)
- R.S.A. 3 Capacitance in AC Circuits (Information Sheet)
- R.S.A. 4 Impedance in AC Series Circuits (Information Sheet)
- R.S.A. 5 Resistance, Inductance and Capacitance in AC Parallel Circuits (Information Sheet)
- R.S.A. 6 Series-Parallel AC Circuits (Information Sheet)
- R.S.A. 7 Polyphase Circuits (Information Sheet)

Unit VI - Motors and Generators

- R.S.A. 1 Principles of Dynamo-Electric Machine (Information Sheet)
- R.S.A. 2 Direct-Current Generators (Information Sheet)
- R.S.A. 3 Direct-Current Motors (Information Sheet)
- R.S.A. 4 Alternating-Current Motors (Information Sheet)

Unit VII -Transformers

- R.S.A. 1 Power Transformers (Information Sheet)
- R.S.A. 2 Instrument Transformers (Information Sheet)

Unit VIII - Fundamentals of Meters

- R.S.A. 1 Direct-Current Meters (Information Sheet)
- R.S.A. 2 Alternating-Current Meters (Information Sheet)

Course Outline (Continued)

Unit VIII (Continued)

- R.S.A. 3    Wattmeters and Watthour-meters (Information Sheet)
- R.S.A. 4    Care and Use of Portable Meters and Indicating Devices (Information Sheet)

Unit IX - Lighting

- R.S.A. 1    Facts About Lighting (Part 1) (Information Sheet)
- R.S.A. 2    Facts About Lighting (Part 2) (Information Sheet)
- R.S.A. 3    Types of Lamps (Information Sheet)
- R.S.A. 4    Computing Electric Light and Power Bills (Information Sheet)

BOOK III - Electrical Apprentice

Unit X - Wiring Methods

- R.S.A. 1    General Provisions of the National Electrical Code (Information Sheet)
- R.S.A. 2    General Requirements for Wiring Methods (Information Sheet)
- R.S.A. 3    Types of Boxes, Box Covers, Box Extensions and Methods of Installation (Information Sheet)
- R.S.A. 4    Polarity Identification of Systems and Circuits (Information Sheet)
- R.S.A. 5    Types of Cables and Fittings (Information Sheet)
- R.S.A. 6    Open Wiring on Insulators and Concealed Knob and Tube Work (Information Sheet)
- R.S.A. 7    Branch Circuits and Service Entrance (Information Sheet)
- R.S.A. 8    Non-metallic Cable Wiring (Information Sheet)
- R.S.A. 9    Armored Cable Wiring (Information Sheet)

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Course Outline (Continued)

Unit X (Continued)

- R.S.A. 10 Diagramming and Wiring Plans (Information Sheet)
- R.S.A. 11 Installing Surface Metal Raceway (Information Sheet)
- R.S.A. 12 Installing Conduit (Information Sheet)
- R.S.A. 13 Methods of Pulling Conductors in Raceways (Information Sheet)
- R.S.A. 14 Use of NEC Tables for Calculating the Number of Conductors in Conduit or Tubing (Information Sheet)
- R.S.A. 15 Bending Conduit and Tubing with Hand Benders (Information Sheet)
- R.S.A. 16 Bending Conduit and Tubing on Hydraulic and Screw Jack Machines (Information Sheet)
- R.S.A. 17 Building Structures and Architectural Symbols (Information Sheet)
- R.S.A. 18 Wiring in Hazardous Locations (Information Sheet)
- R.S.A. 19 Installing Wireways, Busways, Auxiliary Gutters, and Cellular Metal Floor Raceways (Information Sheet)
- R.S.A. 20 Commercial Garages, Service Stations, and Bulk Storage Plants (Information Sheet)
- R.S.A. 21 Installation Practice of Lighting Fixtures (Information Sheet)

Unit XI - Low Voltage Circuits

- R.S.A. 1 Remote-Control, Low-Energy Power, Low-Voltage Power (Information Sheet)
- R.S.A. 2 Introduction to Annunciators (Information Sheet)
- R.S.A. 3 Design of Basic Relay Annunciators (Information Sheet)
- R.S.A. 4 Remote Control Switching (Information Sheet)
- R.S.A. 5 Intercommunicating Telephones (Information Sheet)



Course Outline (Continued)

Unit XII - Appliance-D.C. Motors

- R.S.A. 1     Cooking Appliances (Information Sheet)
- R.S.A. 2     Electric Hot Water Heaters and Gas Furnace  
                 Controls (Information Sheet)

Unit XIII- Direct-Current Motors and Controllers

- R.S.A. 1     Direct-Current Motors (Information Sheet)
- R.S.A. 2     Direct-Current Controllers (Information Sheet)

BOOK IV - Electrical Apprentice

Unit XIV - Alternating Current Motors and Controllers

- R.S.A. 1     Split-Phase Motors (Information Sheet)
- R.S.A. 2     Capacitor Motors (Information Sheet)
- R.S.A. 3     Repulsion Type Motors (Information Sheet)
- R.S.A. 4     Three Phase Motors (Information Sheet)
- R.S.A. 5     N.E.C. Specifications for Motors and  
                 Controllers (Information Sheet)
- R.S.A. 6     Wiring for Motors (Information Sheet)
- R.S.A. 7     Across-the-line Magnetic Starters  
                 Information Sheet)
- R.S.A. 8     Reversing Magnetic Starters (Information Sheet)
- R.S.A. 9     Reduced Voltage Starters (Information Sheet)
- R.S.A. 10    Drum, Two-Speed and Quick-Stop Controllers  
                 (Information Sheet)
- R.S.A. 11    Synchronous Drive and Indicating Systems  
                 (Information Sheet)

Unit XV - Alternators and Distribution

- R.S.A. 1     Alternators (Information Sheet)
- R.S.A. 2     Synchronizing and Phase Alternators (Information  
                 Sheet)

Course Outline (Continued)

Unit XVI -Transformer Principles and Practices

- R.S.A. 1 Introduction to Transformers and Transformer Ratios (Information Sheet)
- R.S.A. 2 Checking Polarity of Transformers (Information Sheet)
- R.S.A. 3 Single Phase Transformer Connections (Information Sheet)
- R.S.A. 4 Three Phase Transformer Connections (Information Sheet)
- R.S.A. 5 Special Application of Transformers (Information Sheet)
- R.S.A. 6 Transformer Oil, and Oil Maintenance (Information Sheet)

Unit XVII - Meters and Metering

- R.S.A. 1 Metering Single Phase Circuits Without Instrument Transformers (Information Sheet)
- R.S.A. 2 Metering Single Phase Circuits With Instrument Transformers (Information Sheet)
- R.S.A. 3 Metering Polyphase Circuits With and Without Instrument Transformers (Information Sheet)

Unit XVIII - Fundamental Electronics

- R.S.A. 1 Vacuum Tubes as Rectifiers (Information Sheet)
- R.S.A. 2 Solid State Rectifiers (Information Sheet)
- R.S.A. 3 Rectifier Filters (Information Sheet)
- R.S.A. 4 Triode Tube (Information Sheet)
- R.S.A. 5 Operation Gas Filled Tubes (Information Sheet)
- R.S.A. 6 Thyatron Tube (Information Sheet)
- R.S.A. 7 Photo-Cells and Controls (Information Sheet)
- R.S.A. 8 Electronic Motor Controls (Information Sheet)

Course Outline (Continued)

Unit XVIII (Continued)

R.S.A. 9 Magnetic Amplifier Control in D. C. (Information Sheet)

R.S.A. 10 Magnetic Amplifier Control A.C. (Information Sheet)

Unit XIX - Welding and Cutting

R.S.A. 1 Functions and Operating Principles of Oxy-Acetylene, Regulators, Blowpipes, and Accessories (Information Sheet)

R.S.A. 2 Setting Up Oxy-Acetylene Equipment (Information Sheet)

R.S.A. 3 Oxy-Acetylene Welding (Information Sheet)

R.S.A. 4 Oxy-Acetylene Cutting (Information Sheet)

R.S.A. 5 Characteristics of Arc Welding (Information Sheet)

R.S.A. 6 Types of Electrodes (Information Sheet)

R.S.A. 7 Characteristics of Inert Gas Welding (Information Sheet)

Unit XX - Protective Relaying Principles and Practices

R.S.A. 1 General (Information Sheet)

R.S.A. 2 Differential Protection (Information Sheet)

R.S.A. 3 Line Protection (Information Sheet)

R.S.A. 4 Definitions (Information Sheet)

BOOK V - Electrical Apprentice

Unit XXI - Illumination and Wiring Commercial and Industrial Buildings

R.S.A. 1 Illumination Design Data for Interiors (Information Sheet)

R.S.A. 2 Calculations for Illuminating an Industrial Shop (Information Sheet)

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GENERAL APPRENTICES  
Apprentice

C Page 1 of 2

The General Apprentices Course was written in 1954. It is available in the following form:

Book  
    Unit I  
Book  
    Unit II  
  
Test Book  
    Book  
        Unit I  
    Book  
        Unit II  
  
Answer Books  
    Book  
        Unit I  
    Book  
        Unit II

The following instructor's aids are available:  
    Progress Chart

A detailed outline of the General Apprentices Course follows:

- R.S.A. 1 - Getting and Holding a Job (Information Sheet)
- R.S.A. 2 - Qualities Essential to Success (Information Sheet)
- R.S.A. 3 - Workmen's Compensation Law in Louisiana (Information Sheet)
- R.S.A. 4 - Social Security Act
- R.S.A. 5 - Capital, Labor, and Management
- R.S.A. 6 - Employer and Employee Organizations (Information Sheet)
- R.S.A. 7 - Everyday Safety (Information Sheet)
- R.S.A. 8 - Skilled Training for Workmen (Information Sheet)
- R.S.A. 9 - Keeping Up With Occupational Changes (Information Sheet)
- R.S.A. 10 - Apprenticeship (Information Sheet)
- R.S.A. 11 - Insurance (Information Sheet)
- R.S.A. 12 - Business Letters (Information Sheet)

Course Outline (Continued)

R.S.A. 13 - Personal Checks and Drafts

R.S.A. 14 - Keeping Accounts

R.S.A. 15 - Making and Reading Line Graphs

Unit II - Work Habits

R.S.A. 1 - Work Habits (Information Sheet)

R.S.A. 2 - Dependability (Information Sheet)

R.S.A. 3 - Orderliness (Information Sheet)

R.S.A. 4 - Method (Information Sheet)

R.S.A. 5 - Organization (Information Sheet)

R.S.A. 6 - Accuracy (Information Sheet)

R.S.A. 7 - Neatness (Information Sheet)

R.S.A. 8 - Respect for Materials (Information Sheet)

R.S.A. 9 - Economical Use of Materials (Information Sheet)

R.S.A. 10 - Ability to Solve Problems (Information Sheet)

R.S.A. 11 - Part I - Safety (Information Sheet)  
Part II - Safety (Information Sheet)

R.S.A. 12 - Cooperation (Information Sheet)

R.S.A. 13 - Miscellaneous Work Habits (Information Sheet)



MACHINIST  
Apprentice

C Page 1 of 10

Units I and II of Machinist Apprentice was published in 1949, Unit III 1950, and Units IV through X in 1952. It is available in the following forms:

Related Study Assignments, Mathematics and Blueprint

- Book 1 - Units I and II
- Book 2 - Unit III
- Book 3 - Units IV and V
- Book 4 - Units VI through X

Test Books

- Book 1 - Units I and II  
Final Examination
- Book 2 - Unit III  
Final Examination
- Book 3 - Units IV and V
- Book 4 - Units VI through IX - No Test on Unit X

Answer Books

- Book 1 - Units I and II
- Book 2 - Unit III
- Book 3 - Units IV and V
- Book 4 - Units VI through IX

The following instructor's aids are available:

- Progress Charts
- Monthly Report forms

The references for the Machinist Apprentice Course are the following:

Title	Source
Axelrod Aaron, MACHINE SHOP MATHEMATICS 1947	McGraw-Hill Book Company 330 West 42nd Street New York 36, New York
Burghardt, Henry D., MACHINE TOOL OPERATION, Part I 1941 and Part II	McGraw-Hill Book Company 330 West 42nd Street New York 36, New York
Giachino, J. W., and Feirer, John L. BASIC BENCH-METAL PRACTICE AND PRECISION MEASURING, 1943	Chas. A. Bennett Co., Inc. 237 N. Monroe Street Peoria, Illinois
Jones, J. D., MACHINE SHOP TRAINING COURSE, Volume 1, Second Edition	The Industrial Press 148 Lafayette Street New York 13, New York
Rogers, W. W., and Welton, P. L., BLUEPRINT READING AT WORK, 1944	Silver Burdett Company 45 East 17th Street New York 3, New York

References (Continued)

Title	Source
Inne, R. W., and Streeter, MACHINE TRADES BLUEPRINT READING, 1948	American Technical Society 848 East Fifty-eighth St. Chicago 37, Illinois
SHAPER WORK	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
MILLING MACHINE WORK	Delmar Publishers, Inc. Mountainview Avenue Albany 5, New York
Smith, ADVANCED MACHINE WORK	Industrial Education Book Co. Boston, Massachusetts
Oberg and Jones, MACHINERY'S HANDBOOK, 15th Edition	The Industrial Press 148 Lafayette Street New York 36, New York

A detailed outline of the Machinist Apprentice Course follows:

Unit I - Bench and Floor

- |        |    |   |
|--------|----|---|
| R.S.A. | 1: | Layout Tools and Their Uses<br>Math: The Machinist's Rule<br>Blueprint Reading: How to Understand Blueprints                |
| R.S.A. | 2: | Files and Filing<br>Math: Angular Measurement<br>Blueprint Reading: Three-View Drawings: Horizontal<br>and Vertical Surface |
| R.S.A. | 3: | Chisels and Their Uses<br>Math: Cutting Stock<br>Blueprint Reading: Three-View Drawings: Slanting<br>Surfaces               |
| R.S.A. | 4: | Heat Treatment of Steel<br>Math: Expansion of Metals<br>Blueprint Reading: Three-View Drawings: Hidden<br>Lines             |
| R.S.A. | 5: | Hack Saws and Sawing<br>Math: Weight of Stock<br>Blueprint Reading: Three-View Drawing Scales                               |

Course Outline (Continued)

Unit I - Bench and Floor (Continued)

- R.S.A. 6: Reamers and Reaming  
Math: Tap Drill Sizes  
Blueprint Reading: Two-View Drawings: Curved Surfaces
- R.S.A. 7: Die Threading and Tapping  
Math: Tap Drill Sizes  
Blueprint Reading: Two-View Drawings: Curved Surface
- R.S.A. 8: Scrapers and Scraping  
Math: Solution of Formulas  
Blueprint Reading: Two-View Drawings: Decimal Tolerance
- R.S.A. 9: Babbitting  
Math: The Circle  
Blueprint Reading: Two-View Drawings: Angular Tolerances
- R.S.A. 10: Types of Drills  
Math: Geometric Construction  
Blueprint Reading: One-View Drawings
- R.S.A. 11: Fits, Limits, and Tolerance  
Math: The Rectangle  
Blueprint Reading: Bracket Blueprint
- R.S.A. 12: Care and Use of Grinders  
Math: Speed of Pulleys  
Blueprint Reading: Sectional Drawings: Full Section
- R.S.A. 13: The Power Hack Saw  
Math: The Right Triangle  
Blueprint Reading: Sectional Drawings: Half Section
- R.S.A. 14: Color Code of Steel  
Blueprint Reading: Sectional Drawings: Detail View
- R.S.A. 15: Soldering  
Math: Belting

Course Outline (Continued)

Unit I - Bench and Floor (Continued)

R.S.A. 16: Abrasives and Grinding Wheels  
Math: Power of Belting

R.S.A. 17: Producing, Processing, and Identifying Iron and Steel  
Math: Review Problems on Belting

Unit II - Drill Press

R.S.A. 1: Types of Drill Presses and Their Operation  
Blueprint Reading: Sectional Drawings: Special  
Types of Sections

R.S.A. 2: Speed and Feeds of a Drill Press  
Math: Speed of Drills  
Blueprint Reading: Screw Fastening: External  
Threads

R.S.A. 3: Sharpening Drills  
Math: Drill Press Feed  
Blueprint Reading: Screw Fastenings: Internal  
Threads

R.S.A. 4: Drill Chucks and Sleeves  
Blueprint Reading: Screw Fastenings: Detail  
Thread Problems

R.S.A. 5: Holding the Work  
Blueprint Reading: Auxiliary View Drawings

R.S.A. 6: Coolants  
Math: Liquid Measure  
Blueprint Reading: T-Slide Bracket

R.S.A. 7: Drilling  
Blueprint Reading: Assembly Drawing

R.S.A. 8: Reamers and Reaming  
Math: Principles of Micrometer  
Blueprint Reading: Drill Jig

R.S.A. 9: Counterboring, Countersinking, Boring, and Tapping  
Math: Mechanical Work and Power  
Blueprint Reading: Milling Fixture for T-Slot Nut

Bibliography: Required Textbooks

Course Outline (Continued)

Unit III - Lathe

- R.S.A. 1: Types of Lathes and Identification of Parts  
Blueprint Reading: Introduction
- R.S.A. 2: Principles of Lathe  
Math: Shop Arithmetic
- R.S.A. 3: Care and Use of the Lathe  
Math: Cutting Speed
- R.S.A. 4: Lathe Holding Devices  
Math: Cutting Time  
Blueprint Reading: Introduction
- R.S.A. 5: Center Drilling and Care of Lathe Centers  
Math: Review Problems on Feeds and Speeds
- R.S.A. 6: Cutting Tools and Their Holding Devices  
Math: Cutting Stock  
Blueprint Reading: Isometric and Three View  
Sketching
- R.S.A. 7: Straight Turning  
Math: Simple Gearing  
Blueprint Reading: Rectangular Objects
- R.S.A. 8: Shoulder Turning, Facing and Necking  
Math: Compound Gearing  
Blueprint Reading: The Rectangular Object
- R.S.A. 9: Knurling  
Math: The Vernier Caliper
- R.S.A. 10: Math: Shop Trigonometry (Right Triangle)
- R.S.A. 11: Turning Tapers and Angles with the Compound  
Rest  
Math: Cutting Tapers Using the Compound Rest
- R.S.A. 12: Turning Tapers: Tailstock Offset Method  
Math: Calculation of Tapers and Tailstock Offset
- R.S.A. 13: Turning Tapers: Taper Attachment  
Math: Cutting Tapers by Use of Taper Attachment
- R.S.A. 14: Drilling and Reaming  
Blueprint Reading: Rectangular Objects

Course Outline (Continued)

Unit III - Lathe (Continued)

- R.S.A. 15: Filing and Polishing  
Blueprint Reading: Invisible Surfaces
- R.S.A. 16: Boring and Counterboring  
Blueprint Reading: Invisible Surfaces
- R.S.A. 17: Undercutting and Back-facing  
Blueprint Reading: Start Surfaces
- R.S.A. 18: Tapping  
Math: The American Standard Screw Thread System  
Blueprint Reading: Round Objects
- R.S.A. 19: Taper Boring  
Blueprint Reading: Round Objects
- R.S.A. 20: Screw Thread Standards  
Blueprint Reading: Auxiliary Views
- R.S.A. 21: Thread Cutting (V-Shape)  
Math: Simple Lathe Gearing for Thread Cutting
- R.S.A. 22: Threading (Acme and Square) Single and Multiple  
Math: Square and Acme Thread Calculations
- R.S.A. 23: Internal Threading  
Math: Tap Drill Sizes for Square and Acme Threads  
Blueprint Reading: Chuck - Working Drawing
- R.S.A. 24: Spring Winding in a Lathe  
Math: Shop Trigonometry (Equilateral Triangle)  
Blueprint Reading: Automatic Oiler - Working Drawing
- R.S.A. 25: Interchangeable Manufacturer and Classes of Fits  
for Assembled Machine Parts  
Math: Shop Trigonometry (Isosceles Triangle)  
Blueprint Reading: Steering Sector Arm No. 1 -  
Working Drawing
- R.S.A. 26: Cutting Off Bar Stock in a Lathe  
Math: Cutting Threads by Compound Gearing  
Blueprint Reading: Bar - Working Drawing
- R.S.A. 27: Crankshaft Turning  
Math: Time Measurement (Wages)
- Bibliography: Books Required For Each Apprentice



Course Outline (Continued)

Unit IV - Shaper

- R.S.A. 1: Name of Parts
- R.S.A. 2: Shaper Construction  
Math: Cutting Speeds of Planers and Shapers  
Blueprint Reading: Drilling Fixture
- R.S.A. 3: Planer Construction  
Math: Strokes Per Minute and Cutting Speed
- R.S.A. 4: Shaper and Planer Cutting Tools  
Math: Planer and Shaper Feed
- R.S.A. 5: Shaper and Planer Work Holding Devices  
Math: Practical Measurements (Parallelogram)  
Blueprint Reading: Shift Fork
- R.S.A. 6: Causes of Inaccurate Work  
Math: Practical Measurements (Scalene Triangle)  
Blueprint Reading: Die
- R.S.A. 7: Machining Flat and Horizontal Surfaces  
Math: Review Problems
- R.S.A. 8: Vertical, Angular, Contour, and Form Planing  
Math: Shop Trigonometry (Review Problems)
- R.S.A. 9: Slotting and Keyseating  
Math: Shop Trigonometry (The Sine and Cosine Law)
- R.S.A. 10: How to Cut Serrations  
Math: Shop Trigonometry (General Review Problems)

Unit V - Milling Machine

- R.S.A. 1: Types, Sizes, and Uses of Milling Machines  
Math: Milling Machine Cutting Speeds
- R.S.A. 2: Care and Maintenance of the Milling Machine  
Math: Milling Machine Feed
- R.S.A. 3: Types of Cutter and Work Holding Devices
- R.S.A. 4: Proper Care and Use of Cutter and Work Holding Devices
- R.S.A. 5: Types of Cutters for the Milling Machine

Course Outline (Continued)

Unit V - Milling Machine (Continued)

- R.S.A. 6: Milling Machine Attachments
- R.S.A. 7: Coolants and Their Use
- R.S.A. 8: Milling Flat Surfaces  
Math: Milling Round Stock Into Rectangular Bars
- R.S.A. 9: Milling Ends and Faces
- R.S.A. 10: Sawing, Slotting, and Keyway Milling
- R.S.A. 11: Form Milling
- R.S.A. 12: Angular Milling
- R.S.A. 13: Gang Milling
- R.S.A. 14: Dividing Head and Foot Stock  
Math: Direct and Simple Indexing
- R.S.A. 15: Spur Gear Rules and Formulas  
Blueprint Reading: Spur Gear
- R.S.A. 16: Milling Spur Gears  
Math: Calculations for Spur Gears  
Blueprint Reading: Spur Gear
- R.S.A. 17: Bevel Gears  
Math: Calculations for Bevel Gears  
Blueprint Reading: Bevel Gear
- R.S.A. 18: Worm and Gear  
Math: Calculations for Worm Gears
- R.S.A. 19: Helical Milling
- R.S.A. 20: Graduating  
Math: Graduating
- R.S.A. 21: Milling Helical Gears
- Bibliography: Required Textbooks for Shaper and Milling Machine

Course Outline (Continued)

Unit VI - Grinding

- R.S.A. 1: Grinding Machine Construction  
Math: Dimensions, Areas and Volumes of Geometrical Figures
- R.S.A. 2: Grinding Wheels
- R.S.A. 3: Principles of Grinding
- R.S.A. 4: Cylindrical Grinding  
Math: Figuring Tapers
- R.S.A. 5: Surface Grinding
- R.S.A. 6: Internal Grinding
- R.S.A. 7: Grinding Milling Cutters and Reamers

Unit VII - Turret Lathe

- R.S.A. 1: Machine Construction and Work Methods  
Math: Standard Screw Threads

Unit VIII - Welding

- R.S.A. 1: Functions and Operating Principles of Oxy-Acetylene Regulators, Blowpipes, and Accessories
- R.S.A. 2: Setting Up Oxy-Acetylene Equipment
- R.S.A. 3: Oxy-Acetylene Cutting
- R.S.A. 4: Oxy-Acetylene Welding
- R.S.A. 5: Characteristics of Arc Welding
- R.S.A. 6: Types of Electrodes

Unit IX - General Information

- R.S.A. 1: Principles of Bearings
- R.S.A. 2: Belts and Pulleys
- R.S.A. 3: Cutting Oils and Compounds
- R.S.A. 4: Allowance and Tolerances for Fits  
Math: Gear Problems

Course Outline (Continued)

Unit IX - General Information (Continued)

R.S.A. 5: Rigging

R.S.A. 6: Band Sawing Machines

R.S.A. 7: Aligning Machine

R.S.A. 8: Metal Spraying

R.S.A. 9: Machine Tools Today

R.S.A. 10: Personal and Social Problems

Unit X - Horizontal Boring, Drilling & Milling Machine

R.S.A. 1: Machine Fundamentals

R.S.A. 2: Basic Operations

R.S.A. 3: Work Methods

PIPE FITTER  
Apprentice

C Page 1 of 3

The Pipe Fitter Apprentice Course was published in 1952. It is available in the following forms:

Book 1  
Units I - VII

Book 2  
Unit VIII

Book 4  
Units X - XIII

Test Book  
Book 1  
Units I - VII

The following instructor's aids are available:  
Wall Progress Chart

The references for Pipe Fitter Apprentice Course are the following:

Title	Source
Heisler, W. Fred, ELEMENTARY SCIENCE APPLIED TO PETROLEUM PRODUCTION AND REFINING	Oklahoma A & M Book Store Oklahoma A & M College Oklahoma
Castle, Drew W., PROBLEMS IN BLUEPRINT READING	Chas. A. Bennett Co., Inc. Peoria, Illinois
Wolfe and Phelps, PRACTICAL SHOP MATHEMATICS 3rd Ed.	McGraw-Hill Book Co. 330 West 42nd Street New York 36, New York

A detailed outline of the Pipe Fitter Apprentice Course follows:

Book 1: Unit 1 - First Aid

To be taught using Bureau of Mines 10 hr. First Aid Course.

Unit 2: Human Relations

R.S.A. 1: Capital, Labor, and Management  
R.S.A. 2: Social Security Act  
R.S.A. 3: Workmen's Compensation  
R.S.A. 4: Attitudes and Behavior  
R.S.A. 5: Skilled Training for Workers  
R.S.A. 6: Interdependence of Employers and Employees

Course Outline (Continued)

Book 1: Unit 3 - Everyday Safety

R.S.A. 1: General Safety

Unit 4: Plant operation, History and organization

To be taught by Plant Officials

Unit 5: Physics

- R.S.A. 1: Matter and Properties of Matter
- R.S.A. 2: Weights, Measures, and Strength of Materials
- R.S.A. 3: Motion, Force, Work, and Leverage
- R.S.A. 4: Mechanical Devices, Power and Friction
- R.S.A. 5: Liquids and Gases
- R.S.A. 6: Heat and Transmission of Heat
- R.S.A. 7: Expansion, Contraction, Melting, Freezing, Vaporization, and Condensation
- R.S.A. 8: Magnetism and Electricity

Unit 6: Chemistry

- R.S.A. 1: Principles of Chemistry and Common Elements
- R.S.A. 2: Compounds
- R.S.A. 3: Acids, Bases, and Salts
- R.S.A. 4: Combustion, Safety, and terms

Unit 7: Refinery Metals

R.S.A. 1: Types of Metals

Book 2: Unit 8 - Mechanical Drawing

- R.S.A. 1: Beginning Drawing
- R.S.A. 2: Methods of Drawing
- R.S.A. 3: Three View Drawing
- R.S.A. 4: Three View Problems
- R.S.A. 5: Sections
- R.S.A. 6: Dimensions and Notes
- R.S.A. 7: Lettering and Missing Lines
- R.S.A. 8: Drawing Exercises
- R.S.A. 9: Drawing Exercises and Auxiliary Views
- R.S.A. 10: Geometrical Construction
- R.S.A. 11: Projection Study
- R.S.A. 12: Pictorial Drawing
- R.S.A. 13: Layout
- R.S.A. 14: Layout (Continued)
- R.S.A. 15: Layout (Continued)



Course Outline (Continued)

Book 2: Unit 8 (Continued)

- R.S.A. 16: Layout for Eccentric Reducer
- R.S.A. 17: Pipe Sketching
- R.S.A. 18: Pipe Drawing
- R.S.A. 19: Pipe Bends and Assemblies

Book 4: Unit 10 - Arithmetic

- R.S.A. 1: Common Fractions
- R.S.A. 2: Decimals
- R.S.A. 3: Percentage
- R.S.A. 4: Interest and Taxes

Unit 11 - Algebra

- R.S.A. 1: Positive and Negative Numbers and Grouping Symbols
- R.S.A. 2: Addition, Subtraction, Simple Equations
- R.S.A. 3: Ratio and Proportion
- R.S.A. 4: Square Root
- R.S.A. 5: Formulas and Equations

Unit 12 - Beginning Geometry

- R.S.A. 1: Beginning Geometry
- R.S.A. 2: Geometry
- R.S.A. 3: The Right Triangle
- R.S.A. 4: The Right Triangle (Cont'd)
- R.S.A. 5: The Circle

Unit 13 - Trigonometry

- R.S.A. 1: Beginning Trigonometry
- R.S.A. 2: Pipe Layout

THE PLUMBING AND  
PIPE FITTING INDUSTRY  
Apprentice

C Page 1 of 10

The Plumbing and Pipe Fitting Industry was published in 1953-1954. It is available in the following forms:

Related Study Assignments

Book I - Unit I - General Course  
Book II - Unit I - General Course  
Units II, III, IV & V  
Units VI & VII  
Units VIII, IX, X, & XI  
Units XII, XIII, XIV, XV, & XVI

Test Books

Test Book for Unit I  
Test Book for Units II, III, IV & V  
Test Book for Units VI & VII  
Test Book for Units VIII, IX, X, & XI  
Test Book for Units XII, XIII, XIV, XV, & XVI

Answer Book

There is an answer key for each test book

The following instructor's aids are available.

Class Progress Chart (Pad)  
Monthly Report Blanks (Pad)

The references for the Plumbing and Pipe Fitting Industry are listed below.

Title	Source
Dalzell BUILDING TRADES BLUEPRINT READING, 1950	American Technical Society 848 East 58th Street Chicago 37, Illinois
Matthias, A. J., HOW TO DESIGN AND INSTALL PLUMBING	American Technical Society 848 East 58th Street Chicago 37, Illinois
INSTRUCTION MANUAL FOR STEAMFITTING APPRENTICES, Volume I	Heating, Piping and Air Conditioning Contractors National Association 1250 Avenue of the Americas New York 20, New York
LEAD WORK FOR MODERN PLUMBING	Lead Industries Association 60 East 42nd Street New York 17, New York

References (Continued)

Title	Source
HEATING VENTILATING AIR CONDITIONING GUIDE, 17th Edition	American Society of Heating and Ventilating Engineers 51 Madison Avenue New York, New York
Crosby-Fiske-Forster HANDBOOK OF FIRE PROTECTION	National Fire Protection Association Boston, Massachusetts
REGULATIONS FOR THE INSTALLATION OF STANDPIPE AND HOSE SYSTEMS	National Fire Protection Association Boston, Massachusetts

A detailed outline of The Plumbing and Pipe Fitting Industry follows.

Unit I

- R.S.A. A - Background of the Plumbing Industry
- R.S.A. B - Development of Steam
- R.S.A. C - History of Refrigeration and Air Conditioning
- R.S.A. I - Introduction to Plumbing and Pipe Fitting Industry
  - Mathematics: Linear Measurement
  - Blueprint Reading: Shapes of Surfaces and Solids
- R.S.A. 2 - Measuring and Layout Tools
  - Mathematics: Rule Practice
  - Blueprint Reading: Elevation Views
- R.S.A. 3 - Wood Boring Tools
  - Mathematics: Rule Practice
  - Blueprint Reading: Elevations
- R.S.A. 4 - Wrenches and Utility Tools
  - Mathematics: Addition of Rule Graduations
  - Blueprint Reading: Elevations
- R.S.A. 5 - Metal Cutting Tools
  - Mathematics: Subtraction of Scale Measurements
  - Blueprint Reading: Elevations
- R.S.A. 6 - Driving Tools
  - Mathematics: Addition of Whole Numbers
  - Blueprint Reading: Plan Views
- R.S.A. 7 - Drilling Holes in Metal
  - Mathematics: Subtraction of Whole Numbers
  - Blueprint Reading: Symbols for Elevations
- R.S.A. 8 - Punching Holes in Metal
  - Mathematics: Multiplication of Whole Numbers
  - Blueprint Reading: Symbols for Elevations

THE PLUMBING AND  
PIPE FITTING INDUSTRY  
Apprentice

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Outline (Continued)

Unit I (Continued)

- R.S.A. 9 - Cutting, Reaming, and Threading Tools  
Mathematics: Division of Whole Numbers  
Blueprint Reading: Symbols for Elevations
- R.S.A. 10- Tubing Tools  
Mathematics: Reducing Fractions to Lowest Terms  
Blueprint Reading: Plan Views
- R.S.A. 11- Brazing Copper Pipe  
Mathematics: Changing Improper Fractions to Mixed Numbers  
Blueprint Reading: Plan Views
- R.S.A. 12- Soldering and Brazing Copper Pipe and Tubing  
Mathematics: Changing Mixed Numbers to Improper Fractions  
Blueprint Reading: Plan Views
- R.S.A. 13- Soldering, Tools, and Procedures  
Mathematics: Changing Fractions to Higher Terms  
Blueprint Reading: Plan Views
- R.S.A. 14- Welding  
Mathematics: Least Common Denominators  
Blueprint Reading: Plan Terms
- R.S.A. 15- Mitered Bends  
Mathematics: Addition of Fractions  
Blueprint Reading: Symbols and Conventions for Plan Views
- R.S.A. 16- Branch Layout  
Mathematics: Subtraction of Fractions  
Blueprint Reading: Symbols and Conventions for Plan Views
- R.S.A. 17- Pipe Bend Developing  
Mathematics: Multiplication of Fractions  
Blueprint Reading: Symbols and Conventions for Plan Views
- R.S.A. 18- Pipe Bending  
Mathematics: Review Problems  
Blueprint Reading: Scaling and Dimensions
- R.S.A. 19- Hot Bending  
Mathematics: Review Problems  
Blueprint Reading: Scaling and Dimensions
- R.S.A. 20- Rigging  
Mathematics: The Decimal System  
Blueprint Reading: Scaling and Dimensions
- R.S.A. 21- Valves and Cocks  
Mathematics: Addition and Subtraction of Decimals  
Blueprint Reading: Scaling and Dimensions

THE PLUMBING AND  
PIPE FITTING INDUSTRY  
Apprentice

C Page 4 of 10

Outline (Continued)

Unit I (Continued)

- R.S.A. 22- Gaskets and Gasket Materials  
Mathematics: Multiplication of Decimals  
Blueprint Reading: Structural Details
- R.S.A. 23- Identification of Bolts and Screws  
Mathematics: Changing Common Fractions to Decimals  
Blueprint Reading: Structural Details
- R.S.A. 24- Pipe Supports and Hangers  
Mathematics: Changing Common Fractions to Decimals  
Blueprint Reading: Structural Details
- R.S.A. 25- Insulating Materials  
Mathematics: Simple Percentage  
Blueprint Reading: Structural Details
- R.S.A. 26- Graphical Symbols for Piping  
Mathematics: Discount  
Blueprint Reading: Structural Details
- R.S.A. 27- Functions and Operating Principles of Oxy-Acetylene, Regulators, Blowpipes, and Accessories  
Mathematics: Profit and Loss  
Blueprint Reading: Structural Details
- R.S.A. 28- Oxy-acetylene Welding  
Mathematics: Powers and Roots  
Blueprint Reading: Structural Details
- R.S.A. 29- Arc Welding  
Mathematics: Measurement of Angles  
Blueprint Reading: Second Floors for One-and-a-half-story Houses
- R.S.A. 30- Everyday Safety  
Mathematics: Review  
Blueprint Reading

Unit II - Sewage Disposal

- R.S.A. 1 - Municipal Sewage Treatment  
Mathematics: Review of Rectangular Areas  
Blueprint Reading  
Sketching Problem #1: Sketching Graphic Symbols
- R.S.A. 2 - Municipal Sewer Systems  
Mathematics: Review of Triangular Areas and Formulas  
Blueprint Reading  
Sketching Problem #2: Sketching Graphical Symbols (Contd.)
- R.S.A. 3 - Private Sewage Treatment  
Mathematics: Review of Circles  
Blueprint Reading  
Sketching Problem #3: Sketching Graphic Symbols

Outline (Continued)

Unit III - Pipes and Fittings

R.S.A. No. 1: Principal Types of Pipes and Fittings  
Mathematics: Piping Measurements; Pipe  
Layouts; Tables  
Blueprint Reading

Sketching Problem #1: Sketching Graphic Symbols

R.S.A. No. 2: Joining Vitrified  
Mathematics: Square Root  
Blueprint Reading

Sketching Problem #2: Sketching Symbols for a Screw-Joint  
Installation

R.S.A. No. 3: Joining Cast Iron Pipe  
Mathematics: Volume  
Blueprint Reading

Sketching Problem #3: Sketching Symbols for a Flanged  
Installation

Unit IV - The House Drainage System

R.S.A. No. 1: The House Sewer  
Mathematics: Cylinders  
Blueprint Reading

Sketching Problem #1: Hot and Cold Water Piping--Screw Joints

R.S.A. No. 2: The House Drain  
Mathematics: Volumes of Cylinders  
Blueprint Reading

Sketching Problem #2: Sketching Symbols for a Bell and Spigot  
Installation

R.S.A. No. 3: House Drain Appliances  
Mathematics: Volumes of Cylinders  
Blueprint Reading

Sketching Problem #3: Sketching Symbols for a Welded-Joint  
Installation



Outline (Continued)

Unit IV (Continued)

R.S.A. No. 4: House Drain Appliances (Continued)  
Mathematics: Frustrums of Pyramids and  
Cones  
Blueprint Reading

Sketching Problem #4: Sketching Symbols for a Solder-Joint  
Installation

R.S.A. No. 5: Storm Drainage  
Mathematics: Fractions and Decimals  
Blueprint Reading

Sketching Problem #5: Sketching Symbols for a Bell and  
Spigot and Screw-Joint

R.S.A. No. 7: The Waste Pipe  
Mathematics: Solution of Formulas  
Blueprint Reading

Sketching Problem #7: Sketching Symbols for a Soldered-  
Joint Installation

Unit V - Traps and Ventilation

R.S.A. No. 1: Traps Used on Plumbing Systems  
Mathematics: 45 Degree Elbow Offsets  
Blueprint Reading

Sketching Problem #1: Sketching Symbols for a Solder and  
Screw-Joint Installation

R.S.A. No. 2: Ventilation  
Mathematics: To find the Length of an Offset  
Blueprint Reading

Sketching Problem #2: Identifying Symbols of a Bell and  
Spigot Installation

R.S.A. No. 3: Ventilation (Continued)  
Mathematics: Calculation of Rolling Offsets  
Blueprint Reading

Sketching Problem #3: Identifying Symbols of a Bell and  
Spigot Installation



Outline (Continued)

Unit V (Continued)

R.S.A. No. 4: Soil, Waste, and Vent Pipe Principles  
Mathematics: Radiator Stub Calculations  
Blueprint Reading

Sketching Problem #4: Identifying Symbols of a Flange and  
Screw-Joint Installation

R.S.A. No. 5: Inspection and Test  
Mathematics: Piping Measurements  
Blueprint Reading

Sketching Problem #5: Identifying Symbols of a Solder and  
Screw-Joint Installation

Unit VI - Plumbing Water Supply

R.S.A. No. 1: Properties of Water and Its Sources  
Mathematics: Oblique Triangles  
Problem No. 1: Blueprint Reading  
R.S.A. No. 2: Materials Used for Water Distribution  
Mathematics: Oblique Triangles - The Law  
of Cosines  
Problem No. 2: Materials Used for Water Distribution  
R.S.A. No. 3: Joints on Water Supply Systems  
Mathematics: Oblique Triangles  
Problem No. 3: Blueprint Questions and Scale Rule Measurement  
R.S.A. No. 4: Transite Pressure Pipe  
Mathematics: Oblique Triangles  
Problem No. 4: Symbols for Blueprints  
R.S.A. No. 5: The House Water Supply  
Mathematics: Residence Heat-Loss Calculations  
Problem No. 5: Graphical Symbols for Plumbing  
R.S.A. No. 6: Cold Water Distribution System  
Mathematics: Special Pipe Bends  
Problem No. 6: Letters and Figures  
R.S.A. No. 7: Pumps and Lifts  
Mathematics: Special Pipe Bends  
Problem No. 7: Drawing the Plan  
R.S.A. No. 8: Cold-Water Distribution Systems in Tall  
Buildings  
Mathematics: Subject Matter-Solving by Formulas  
Problem No. 8: Drawing for Plumbers

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Outline (Continued)

Unit VII - Lead Work

- R.S.A. No. 1: The History and Manufacture of Lead  
Mathematics: Heat Transmission - Coefficients  
of Transmission
- Problem No. 1: Three Dimensions on One Drawing
- R.S.A. No. 2: Lead Working Tools  
Mathematics: Coefficients of Transmissions
- Problem No. 2: Isometric Drawing
- R.S.A. No. 3: Soldering with Irons  
Mathematics: Coefficients of Transmission
- Problem No. 3: Oblique Drawing
- R.S.A. No. 4: Bending Lead Pipe  
Mathematics: Calculation of U Factors
- Problem No. 4: Pipes in Three Dimension Drawing
- R.S.A. No. 5: Care and Cleaning of Wiping Solder--Flange  
Joints  
Mathematics: Calculation of U Factors
- Problem No. 5: Pipe Fittings
- R.S.A. No. 6: Preparing and Wiping Horizontal Round Joints  
Mathematics: Heat-Loss Calculations
- Problem No. 6: Pipe Measurement
- R.S.A. No. 7: Preparing and Wiping Vertical Round Joints--  
Branch Joints  
Mathematics: Heat-Loss Calculations
- Problem No. 7: Waste and Vent
- R.S.A. No. 8: Wiping Branch Joints and Wiping Lead to Brass  
Mathematics: Heat-Loss Calculations
- Problem No. 8: Hot and Cold Water
- R.S.A. No. 9: Capping Lead Pipe--Making Sheet Lead Pans and  
Linings  
Mathematics: Graphic Representation--Pressure  
and Head Curves
- R.S.A. No. 10: Lead Welding  
Mathematics: Trigonometric Ratios--Capacity  
of Tanks
- Problem No. 10: Layout of Unit Dwellings

Unit VIII - Hot-Water Systems

- R.S.A. No. 1: Domestic Hot-Water Supply
- Mathematics 1: Review; Linear Measurements and Rule  
Graduations
- R.S.A. No. 2: Hot-Water Distribution Systems
- Mathematics 2: Addition, Subtraction, Multiplication, and  
Division of Whole Numbers

Outline (Continued)

Unit IX - Special Piping

R.S.A. No.	1:	Domestic Hot-Water Supply
Mathematics	1:	Working With Fractions
R.S.A. No.	2:	Cross-Connection
Mathematics	2:	Working with Decimals
R.S.A. No.	3:	Fire Line Installation
Mathematics	3:	Simple Percentage, Discount, and Profit and Loss

Unit X - Plumbing Fixtures

R.S.A. No.	1:	Water Closets
Mathematics	1:	Powers and Roots
R.S.A. No.	2:	The Lavatory
Mathematics	2:	Review of Areas
R.S.A. No.	3:	The Bathtub
Mathematics	3:	Review of Areas of Triangles and Circles
R.S.A. No.	4:	Sinks
Mathematics	4:	Piping Offset Calculations
R.S.A. No.	5:	Special Plumbing Fixtures
Mathematics	5:	Volumes

Unit XI - Radiant Heating

R.S.A. No.	1:	Radiant Heating
Mathematics	1:	Frustums of Pyramids and Cones
R.S.A. No.	2:	Radiant Heating (Continued)
Mathematics	2:	Calculation Rolling Offsets
R.S.A. No.	3:	Radiant Heating (Continued)
Mathematics	3:	Heat-Loss Calculations
R.S.A. No.	4:	Radiant Heating (Continued)
Mathematics	4:	Final Test
R.S.A. No.	5:	Radiant Heating (Concluded)
Mathematics	5:	Final Test

Unit XII - Household Appliances

R.S.A. No.	1:	The Food-Waste Disposal Unit and the Automatic Dishwasher
R.S.A. No.	2:	The Automatic Washing Machine

Unit XIII - Domestic Heating

R.S.A. No.	1:	Gas Piping
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Outline (Continued)

Unit XIII (Continued)

- R.S.A. No. 2: Venting Gas Appliances -- Clearance
- R.S.A. No. 3: Space Heaters
- R.S.A. No. 4: Gas Floor Furnace Installation

Unit XIV - Fire Protection

- R.S.A. No. 1: Development of Sprinkler Protection
- R.S.A. No. 2: Automatic Sprinkler Installations
- R.S.A. No. 3: Special Types of Sprinkler Systems
- R.S.A. No. 4: Water-Flow Sprinkler Alarms--Sprinkler  
Inspection and Supervision

Unit XV - Planning and Estimating

- R.S.A. No. 1: Raised Cottage Construction
- R.S.A. No. 2: Concrete Slab on Ground Construction
- R.S.A. No. 3: Low Priced Raised Cottage Construction
- R.S.A. No. 4: Concrete Slab on Ground Construction

Unit XVI - Personal and Social Problems

- R.S.A. No. 1: Workmen's Compensation Law in Louisiana
- R.S.A. No. 2: Social Security Act

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The Plumbing and Pipe Fitting Industry (Steam Fitting) was published in 1953. It is available in the following forms:

Related Study Assignment

- Book 1
  - Unit I
- Book 2
  - Unit I (Continued)
- Book 3
  - Units II and III
- Book 4
  - Units IV and V

Test Books

- Book 1
  - Unit I
- Book 2
  - Unit II and III
- Book 3
  - Unit IV and V

Answer Books

- Book 1
  - Unit I
- Book 2
  - Units II and III
- Book 3
  - Units IV and V

The following instructor's aids are available:  
Progress Chart

The references for the Plumbing and Pipe Fitting Industry (Steam Fitting) Course are the following:

Title	Source
Dalzell, BUILDING TRADES BLUEPRINT READING, 1950	American Technical Society 848 East Fifty-Eighth Street Chicago 37, Illinois
INSTRUCTION MANUAL FOR STEAMFITTING APPRENTICES, Volume I	Heating, Piping and Air Conditioning Contractors National Association 1250 Avenue of the Americas New York 20, New York

A detailed outline of the Plumbing and Pipe Fitting Industry (Steam Fitting) Course follows:

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Course Outline

UNIT I - General Course

- |            |     |   |
|------------|-----|---|
| R.S.A. No. | A:  | Part I: Background of the Plumbing Industry   |
| R.S.A. No. | B:  | Part 2: Development of Steam  |
| R.S.A. No. | C:  | Part 3: History of Refrigeration and Air Conditioning   |
|            |     |   |
| R.S.A. No. | 1:  | Introduction to Plumbing and Pipe Fitting Industry<br>Mathematics: Linear Measurement<br>Blueprint Reading: Shapes of Surfaces and Solids |
| R.S.A. No. | 2:  | Measuring and Layout Tools<br>Mathematics: Rule Practice<br>Blueprint Reading: Elevation Views  |
| R.S.A. No. | 3:  | Wood Boring Tools<br>Mathematics: Rule Practice<br>Blueprint Reading: Elevations  |
| R.S.A. No. | 4:  | Wrenches and Utility Tools<br>Mathematics: Addition of Rule Graduations<br>Blueprint Reading: Elevations                                  |
| R.S.A. No. | 5:  | Metal Cutting Tools<br>Mathematics: Subtraction of Scale Measurements<br>Blueprint Reading: Elevations                                    |
| R.S.A. No. | 6:  | Driving Tools<br>Mathematics: Addition of Whole Numbers<br>Blueprint Reading: Plan Views  |
| R.S.A. No. | 7:  | Drilling Holes in Metal<br>Mathematics: Subtraction of Whole Numbers<br>Blueprint Reading: Symbols for Elevations                         |
| R.S.A. No. | 8:  | Punching Holes in Metal<br>Mathematics: Multiplication of Whole Numbers<br>Blueprint Reading: Symbols for Elevations                      |
| R.S.A. No. | 9:  | Cutting, Reaming, and Threading Tools<br>Mathematics: Division of Whole Numbers<br>Blueprint Reading: Symbols of Elevations               |
| R.S.A. No. | 10: | Tubing Tools<br>Mathematics: Reducing Fractions to Lowest Terms<br>Blueprint Reading: Plan Views  |



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Course Outline (Continued)

UNIT I (Continued)

- R.S.A. No. 11: Brazing Copper Pipe  
Mathematics: Changing Improper Fractions to Mixed Numbers  
Blueprint Reading: Plan Views
- R.S.A. No. 12: Soldering and Brazing Copper Pipe and Tubing  
Mathematics: Changing Mixed Numbers to Improper Fractions  
Blueprint Reading: Plan Views
- R.S.A. No. 13: Soldering, Tools, and Procedures  
Mathematics: Changing Fractions to Higher Terms  
Blueprint Reading: Plan Views
- R.S.A. No. 14: Welding  
Mathematics: Least Common Denominators  
Blueprint Reading: Plan Terms
- R.S.A. No. 15: Mitered Bends  
Mathematics: Addition of Fractions  
Blueprint Readings: Symbols and Conventions for Plan View
- R.S.A. No. 16: Branch Layout  
Mathematics: Subtraction of Fractions  
Blueprint Reading: Symbols and Conventions for Plan View
- R.S.A. No. 17: Pipe Bend Developing  
Mathematics: Multiplication of Fractions  
Blueprint Reading: Symbols and Conventions for Plan Views
- R.S.A. No. 18: Pipe Bending  
Mathematics: Division of Fractions  
Blueprint Reading: Scaling and Dimensions
- R.S.A. No. 19: Hot Bending  
Mathematics: Review Problems  
Blueprint Reading: Scaling and Dimensions
- R.S.A. No. 20: Rigging  
Mathematics: The Decimal System  
Blueprint Reading: Scaling and Dimensions



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Course Outline (Continued)

UNIT I (Continued)

- R.S.A. No. 21: Valves and Cocks  
Mathematics: Addition and Subtraction of Decimal  
Blueprint Reading: Scaling and Dimensions
- R.S.A. No. 22: Gaskets and Gasket Materials  
Mathematics: Multiplication of Decimals  
Blueprint Reading: Structural Details
- R.S.A. No. 23: Identification of Bolts and Screws  
Mathematics: Changing Common Fractions to Decimals  
Blueprint Reading: Structural Details
- R.S.A. No. 24: Pipe Supports and Hangers  
Mathematics: Changing Common Fractions to  
Decimals  
Blueprint Reading: Structural Details
- R.S.A. No. 25: Insulating Materials  
Mathematics: Simple Percentage  
Blueprint Reading: Structural Details
- R.S.A. No. 26: Graphical Symbols for Piping  
Mathematics: Discount  
Blueprint Reading: Structural Details
- R.S.A. No. 27: Functions and Operating Principles of Oxy-  
Acetylene, Regulators, Blowpipes, and  
Accessories  
Mathematics: Profit and Loss  
Blueprint Reading: Structural Details
- R.S.A. No. 28: Oxy-Acetylene Welding  
Mathematics: Powers and Roots  
Blueprint Reading: Structural Details
- R.S.A. No. 29: Arc Welding  
Measurement of Angles  
Blueprint Reading: Second Floors for One-and-  
a-half-story houses
- R.S.A. No. 30: Everyday Safety  
Mathematics: Review  
Blueprint Reading:

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Course Outline (Continued)

UNIT II - Related Science

- R.S.A. No. 1: Pressure of Liquids at Rest-Heads  
Mathematics: Review of Rectangular Areas  
Blueprint Reading
- R.S.A. No. 2: Atmospheric Pressure  
Mathematics: Review of Triangular Area and  
Formulas  
Blueprint Reading
- R.S.A. No. 3: Weight, Density, and Specific Gravity  
Mathematics: Review of Circles  
Blueprint Reading
- R.S.A. No. 4: Buoyancy  
Mathematics: Piping Measurements, Pipe Layouts;  
Tables  
Blueprint Reading
- R.S.A. No. 5: Water Head  
Mathematics: Square Root  
Blueprint Reading
- R.S.A. No. 6: Molecular Basis of Heat  
Mathematics: Volume  
Blueprint Reading
- R.S.A. No. 7: An Elementary Study of Heat  
Mathematics: Cylinders  
Blueprint Reading
- R.S.A. No. 8: Intensity of Heat-Temperature  
Mathematics: Volumes  
Blueprint Reading
- R.S.A. No. 9: Specific Heat  
Mathematics: Volumes of Cylinders  
Blueprint Reading
- R.S.A. No. 10: A Study of B.T.U.  
Mathematics: Frustrums of Pyramids and Cones  
Blueprint Reading
- R.S.A. No. 11: Generation of Heat  
Mathematics: Fractions and Decimals  
Blueprint Reading

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Course Outline (Continued)

UNIT II (Continued)

- R.S.A. No. 12: Expansion  
Mathematics: Piping Measurements  
Blueprint Reading
- R.S.A. No. 13: Steam Tables and Latent Heat  
Mathematics: Solution of Formulas  
Blueprint Reading
- R.S.A. No. 14: Work and Power  
Mathematics: 45 Degree Elbow Offsets  
Blueprint Reading

UNIT III - Related Science

- R.S.A. No. 1: Forms of Heat  
Mathematics: To Find the Length of an Offset  
Blueprint Reading
- R.S.A. No. 2: Properties of Water  
Mathematics: Calculation of Rolling Offsets  
Blueprint Reading
- R.S.A. No. 3: Evaporation and Boiling  
Mathematics: Radiator Stub Calculations  
Blueprint Reading
- R.S.A. No. 4: Pressure  
Mathematics: Piping Measurements  
Blueprint Reading
- R.S.A. No. 5: Relations of Temperature, Pressure and Volume  
of Steam  
Mathematics: Arithmetic--Square Root
- R.S.A. No. 6: Flow of Steam in Pipes  
Mathematics: To Find the Unknown Angles
- R.S.A. No. 7: Critical Velocity  
Mathematics: Trigonometry Method
- R.S.A. No. 8: Miscellaneous Procedures  
Mathematics: Trigonometry Method
- R.S.A. No. 9: Review Test
- R.S.A. No. 10: Review Test

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Course Outline (Continued)

UNIT IV - Related Science

- R.S.A. No. 1: Considerations in Installing a One-Pipe Gravity Steam System  
Mathematics: Review of Right Triangles
- R.S.A. No. 2: Piping Connections to Boiler  
Mathematics: Oblique Triangles--The Law of Sines
- R.S.A. No. 3: Piping Between Boiler and Radiators  
Mathematics: Oblique Triangles
- R.S.A. No. 4: Standards for Sizing Boilers  
Mathematics: Oblique Triangles--The Law of Cosines
- R.S.A. No. 5: Air Elimination  
Mathematics: Oblique Triangles
- R.S.A. No. 6: Unit Heater Connections  
Mathematics: Oblique Triangles
- R.S.A. No. 7: Special Piping Arrangements  
Mathematics: Review Test
- R.S.A. No. 8: Vapor Heating  
Mathematics: Review Test
- R.S.A. No. 9: Radiator Traps -- Boiler Return Traps  
Mathematics: Review Test
- R.S.A. No. 10: Air Eliminator  
Mathematics: Special Pipe Bends
- R.S.A. No. 11: Automatic Boiler Water Feeder  
Mathematics: Special Pipe Bends
- R.S.A. No. 12: Vacuum System of Steam Heating--Jennings Vacuum Heating Pump  
Mathematics: Heat Transmission
- R.S.A. No. 13: Dunham Sub-Atmospheric System  
Mathematics: Calculation of U Factors

V - Related Science

- R.S.A. No. 1: Dunham Vacuum Heating Pump  
Mathematics: Heat-Loss Calculations

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Course Outline (Continued)

UNIT V (Continued)

- R.S.A. No. 2: Differential Controller and Selector  
Mathematics: Residence Heat Loss Calculations
- R.S.A. No. 3: Control Valve and Panel  
Mathematics: Heat Loss Calculation for Two  
Apartment Building
- R.S.A. No. 4: Illinois Selective Pressure System  
Mathematics: Heating Estimate for Industrial  
Building
- R.S.A. No. 5: Webster Moderator System  
Mathematics: Graphic Representation
- R.S.A. No. 6: High Vacuum Pump--Comparison of Controls  
Mathematics: Pressure-Head Curves of Water

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The Electrical Utility Workers Training Program material was published in 1962-1963. It is available in book form for the Instructors and Handouts are available for students.

Unit I

Book - Basic Mathematics

Unit II

Book - Simplified Electricity

Unit III

Book - Transformers

Unit IV

Book - Power Distribution and Transmission

The references for the Electrical Utility Workers Training Program are the following:

Title	Source
Cooke, Nelson M. BASIC MATHEMATICS FOR ELECTRONICS Second Edition	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York
Van Valkenburgh, Nooger and Neville, Inc. BASIC ELECTRICITY	John F. Rider Publisher, Inc. 116 West 14th Street New York 11, New York
TRANSFORMER TRAINING PROGRAM Instructor's Manual	Westinghouse Electric Corp. 3875 Florida Avenue Baton Rouge, Louisiana
TRANSFORMER STUDY MANUALS SA-6789-6B, 1955	Westinghouse Electric Corp. 3875 Florida Avenue Baton Rouge, Louisiana
"ON LINE," Part of Unit III, Electrical Utility Workers Training Program	Louisiana State Voc.-Tech. Curriculum Laboratory P. O. Box 657 Natchitoches, Louisiana
DISTRIBUTION TRANSFORMER MANUAL 2485A	General Electric Company Post Office Box 15338 Baton Rouge 15, Louisiana
Croft, Terrell AMERICAN ELECTRICIAN'S HANDBOOK	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York

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References (Continued)

Title	Source
Student Handout #1 DISTRIBUTION APPARATUS HANDBOOK EXCERPTS AND RELATED INFORMATION Courtesy of Westinghouse Electric Corp.	Louisiana State Voc.-Tech. Curriculum Laboratory P. O. Box 657 Natchitoches, Louisiana
DISTRIBUTION SYSTEMS Volume III	Westinghouse Electric Corp. 3875 Florida Avenue Baton Rouge 15, Louisiana
Skrotzki, Bernhardt G. A. ELECTRIC TRANSMISSION AND DISTRIBUTION, 1954	McGraw-Hill Book Co., Inc. 330 West 42nd Street, New York 36, New York
ELECTRICAL UTILITY WORKERS TRAINING PROGRAM, Unit III, Transformers	Louisiana State Voc.-Tech. Curriculum Laboratory P. O. Box 657 Natchitoches, Louisiana
INDUSTRIAL POWER SYSTEM DATA BOOK	General Electric Company Post Office Box 15338 Baton Rouge 15, Louisiana
NATIONAL ELECTRICAL CODE	The National Board of Fire Underwriters 85 John Street New York 38, New York
NATIONAL ELECTRICAL SAFETY CODE HANDBOOK, latest edition	American Standards Association 70 East 45th Street New York, New York
SPECIFICATIONS AND DRAWINGS FOR 7.2/12.5 KV. LINE CONSTRUCTION 1962	Rural Electrification Administration Washington, D. C.
SPECIFICATIONS MANUAL, ELECTRIC EQUIPMENT A1A File #31.R, 1959	General Electric Company Post Office Box 15338 Baton Rouge 15, Louisiana
Knowlton, A. E. STANDARD HANDBOOK FOR ELECTRICAL ENGINEERS 9th edition	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York



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TRAINING PROGRAM  
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References (Continued)

Title	Source
Kurtz, E. B. THE LINEMAN'S HANDBOOK 3rd edition	McGraw-Hill Book Co., Inc. 330 West 42nd Street New York 36, New York

A detailed outline of the Electrical Utility Workers Training Program follows:

Unit I - BASIC MATHEMATICS

- Lesson Plan 1 - Review of Addition and Subtraction
- Lesson Plan 2 - Review of Multiplication and Division
- Lesson Plan 3 - Common Fractions - Addition and Subtraction
- Lesson Plan 4 - Common Fractions - Multiplication and Division
- Lesson Plan 5 - Mixed Numbers
- Lesson Plan 6 - Decimal Fractions and Conversions
- Lesson Plan 7 - Percentage, Ratio and Proportion
- Lesson Plan 8 - Square Root
- Lesson Plan 9 - Introduction to Algebra
- Lesson Plan 10 - General Numbers
- Lesson Plan 11 - Solving Problems by Equations
- Lesson Plan 12 - Literal Equations with One Unknown

Unit II - SIMPLIFIED ELECTRICITY

- Lesson Plan 1 - Magnetism
- Lesson Plan 2 - Methods of Producing Electricity
- Lesson Plan 3 - Current Electricity
- Lesson Plan 4 - Measuring Voltage, Current and Resistance
- Lesson Plan 5 - Ohm's Law--Series Circuits
- Lesson Plan 6 - Electric Power
- Lesson Plan 7 - Ohm's Law--Parallel Circuits
- Lesson Plan 8 - Alternating Current
- Lesson Plan 9 - Inductance and Inductive Reactance
- Lesson Plan 10 - Capacitance and Capacitive Reactance
- Lesson Plan 11 - Impedance in A.C. Series Circuits

Unit III - TRANSFORMERS

- Lesson Plan 1 - Basic Theories and Principles
- Lesson Plan 2 - Transformer Parts, Construction and Assembly
- Lesson Plan 3 - Transformer Protection
- Lesson Plan 4 - Transformer Connections (Part I)
- Lesson Plan 5 - Transformer Connections (Part II)
- Lesson Plan 6 - Transformer Maintenance

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Course Outline (Continued)

Unit IV - POWER DISTRIBUTION AND TRANSMISSION

- Lesson Plan 1 - Distribution Systems
- Lesson Plan 2 - A Study of Primary Distribution Systems
- Lesson Plan 3 - Power Factor
- Lesson Plan 4 - Power Factor (Continued)
- Lesson Plan 5 - Distribution Transformers
- Lesson Plan 6 - The Secondary Distribution System and  
Primary System Protection
- Lesson Plan 7 - Methods of Increasing the Capacity,  
Improving Voltage Regulation and Grounding  
the Distribution System
- Lesson Plan 8 - Electrical Measuring Instruments
- Lesson Plan 9 - Electrical Measurement Instruments (Continued)
- Lesson Plan 10 - Street Lighting
- Lesson Plan 11 - Distribution Line Construction

Slides to be used with this course are also available.  
There are 277 slides in a set at \$1.00 per slide.

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The Highway Engineering Aide Training Program material was published in 1958-1959. It is available in the following forms:

- Unit I
  - Book - Arithmetic (Lessons)
- Unit II
  - Book - Algebra (Lessons)
- Unit III
  - Book - Geometry and Trigonometry
- Unit IV
  - Book - Drawing
- Unit V
  - Book - Surveying

The following instructor's aids are available:

- Book 1 - Instructor's Lesson Plans (Arithmetic)
  - Tests
  - Answers
- Book 2 - Instructor's Lesson Plans (Algebra)
  - Tests
  - Answers
- Book 3 - Instructor's Lesson Plans (Geometry and Trigonometry)
  - Tests
  - Answers
- Book 5 - Instructor's Lesson Plans (Surveying)
  - Tests
  - Answers

The references for the Highway Engineering Aide Training Program are the following:

Title	Source
Slade, Samuel and Margolis, Lois, MATHEMATICS FOR TECHNICAL AND VOCATIONAL SCHOOLS	John Wiley and Sons, Inc. 440 Fourth Avenue New York 16, New York
Giesecke, Mitchell, and Spencer, TECHNICAL DRAWING	The MacMillan Co. Ross Avenue and Akard St. Dallas 1, Texas
Castel, Drew W., PROBLEMS IN BLUEPRINT READING	Chas. A. Bennett Co., Inc. 237 N. Monroe Street Peoria, Illinois

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References (Continued)

Title	Source
APPLIED MATHEMATICS FOR PETROLEUM INDUSTRY	Petroleum Extension Service University of Texas Austin, Texas
Virgil S. Mallory, FIRST ALGEBRA	I. W. Singer Company, Inc. 249-259 West Erie Blvd. Syracuse 12, New York
Davis and Kelly, SHORT COURSE IN SURVEYING	McGraw Hill Book Co. 330 West 42nd Street New York 36, New York

A detailed outline of the Highway Engineering Aide Training Program material follows:

Unit I - Arithmetic

Lesson #1

- I. Introduction
- II. Whole Numbers
  - A. Reading and Writing Numbers
  - B. Addition and Checking Addition
  - C. Subtraction
  - D. Multiplication

Lesson #2

- II. Whole Numbers (Continued)
  - E. Division
- III. Common Fractions
  - A. Addition
  - B. Subtraction

Lesson #3

- III. Common Fractions (Continued)
  - C. Multiplication
  - D. Division
- IV. Mixed Numbers
  - A. Addition

Lesson #4

- IV. Mixed Numbers (Continued)
  - B. Subtraction
  - C. Multiplication
  - D. Division

Lesson #5

- V. Decimal Fractions
  - A. Reading and Writing Decimals
  - B. Addition of Decimals
  - C. Subtraction of Decimals

Course Outline (Continued)

Unit I - Arithmetic (Continued)

Lesson #6

- V. Decimal Fractions (Continued)
  - D. Multiplication
  - E. Division

Lesson #7

- VI. Conversions
  - A. Common Fractions to Decimal Fractions
  - B. Decimal Fractions to Common Fractions
  - C. Review

Lesson #8

- VII. Examination

Lesson #9

- VIII. Percentage
  - A. Definitions
  - B. Equivalents
- IX. Ratio and Proportion
  - A. Ratio
  - B. Proportion
  - C. Inverse Proportion

Lesson #10

- X. Square Root
  - A. Examination Critique
  - B. Definition
  - C. Extracting the Square Root

Lesson #11

- XI. Measurements
  - A. Feet and Inches
  - B. Time
  - C. Weight
  - D. Temperatures

Lesson #12

- XI. Measurements (Continued)
  - E. Density and Specific Gravity

Lesson #13

- XI. Measurements (Continued)
  - F. Absorption and Surface Moisture
  - G. Board Measure
  - H. Review

Lesson #14

- XI. Measurements (Continued)
  - I. Land Measure

Lesson #15

- XII. Plane Figures
  - A. Areas and Perimeters of Rectangles
  - B. Areas and Perimeters of Parallelograms
  - C. Areas and Perimeters of Trapezoids
  - D. Areas and Perimeters of Triangles
  - E. Areas and Perimeters of Circles
  - F. Areas and Perimeters of Ellipses

Course Outline (Continued)

Unit I - Arithmetic (Continued)

Lesson #16

XIII. Solid Figures

- A. Volumes of Rectangular Shaped Solids
- B. Volumes of Cylinders
- C. Volumes of Cones
- D. Volumes of Frustrums of Pyramids and Cones
- E. Volumes of Spheres

Lesson #17

XIV. Examination

Pass out the examination. Be sure that the students return all question sheets

Unit II - Algebra

Lesson #1

I. Introduction

- A. Comparison
- B. Definition
- C. Signs or Symbols of Operation
- D. General Application of Signs and Symbols

Lesson #2

II. General Numbers

- A. Addition and Subtraction of Literal Numbers
- B. Multiplication and Division of Literal Numbers
- C. Exponents and Powers in Formulas
- D. Developing Formulas

Lesson #3

III. Solving Problems by Equations

- A. Axiom I - Division
- B. Axiom II - Multiplication
- C. Axiom III - Subtraction
- D. Axiom IV - Addition
- E. Consecutive Integers
- F. Changing the Subject of a Formula

Lesson #4

IV. Signed Numbers

- A. Definition
- B. Number Scales
- C. Use in Graphs
- D. Addition of Signed Numbers
- E. Subtracting Signed Numbers
- F. Multiplication of Signed Numbers
- G. Signs of Powers
- H. Division of Signed Numbers
- I. Division Written as a Fraction
- J. Algebraic Terms

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Course Outline (Continued)

Lesson #4 (Continued)

- K. Addition of Polynomials
- L. Subtraction of Polynomials
- M. Multiplication of a Polynomial by a Signed Number
- N. Use of Parentheses
- O. Translation of statements into symbols

Lesson #5

V. Graphs

- A. Bar Graphs
- B. Circle Graphs
- C. Line Graphs
- D. Line Graph of Formulas
- E. Line Graphs to Solve Problems
- F. Location of Points on a Graph
- G. Graphs of Equations with two Unknowns
- H. Solving a pair of Linear Equations by Graphs
- I. Formula for a Linear Equation

Lesson #6

VI. Equations with two Unknowns

- A. Solving by Addition
- B. Solving by Substitution
- C. Problems involving two Unknowns

Lesson #7

VII. Product and Quotient of Literal Numbers

- A. Product of Two Monomials
- B. Product of more than Two Monomials
- C. Product of a Polynomial by a Monomial
- D. Product of Two Binomials
- E. Quotient of Two Monomials
- F. Quotient of a Polynomial by a Monomial

Lesson #8

VIII. Special Products and Factors

- A. How to find Monomial Factors
- B. Factoring of a Trinomial
- C. Square of a Binomial
- D. Product of the Sum and Difference of Two Quantities
- E. Factoring the Difference of Two Squares
- F. Finding all the prime Factors
- G. Squaring a Binomial like  $ab + cd$
- H. Factoring a Perfect Square
- I. Factoring a Quadratic Trinomial
- J. Shortcuts in Computation



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Course Outline (Continued)

Unit II - Algebra (Continued)

Lesson #9

- IX. Using Algebraic Fractions in Formulas and Equations
  - A. Reduction of a Fraction
  - B. Changing an Improper Fraction to an Integer or Mixed Expression
  - C. Multiplication of Fractions
  - D. Division of Fractions
  - E. Addition of Fractions with Monomial Denominators
  - F. Addition of Fractions with Binomial Denominators
  - G. Signs of a Fraction
  - H. Changing a Mixed Expression to a Fraction
  - I. Complex Fractions in Algebra

Lesson #10

- X. Ratio and Proportion
  - A. Using Ratios
  - B. Constants, Variables, and Functions
  - C. Similar Figures and Proportion

Lesson #11

- XI. Square Root and Radicals
  - A. Definitions
  - B. Approximate
  - C. Exact Computation
  - D. The Square Root of a Product
  - E. Multiplication of Radicals
  - F. Addition and Subtraction of Radicals
  - G. Value of Mixed Expressions
  - H. Finding the Square Root of a Fraction
  - I. Rationalization of the Denominator of a Fraction
  - J. Use of Fractional Exponents
  - K. Division of a Radical

Lesson #12

- XII. Quadratic Equations
  - A. Definition
  - B. Perfect Square Trinomials
  - C. Solving by Completion of the Square
  - D. Quadratic Equations with Irrational Roots
  - E. A Formula for Solving Quadratic Equations
  - F. Graphs of Quadratic Equations

Lesson #13

- XIII. Quadratic Systems
  - A. Equation of a Circle
  - B. The Equation of a Parabola
  - C. The Equation of an Ellipse
  - D. One equation of a Hyperbola
  - E. Second Equation of a Hyperbola
  - F. Graphical Solution of a Linear Equation and a Quadratic Equation
  - G. Algebraic Solution of a Linear and Quadratic Equation
  - H. Graphical Solution of Two Quadratic Equations

Course Outline (Continued)

Unit II - Algebra (Continued)

Lesson #14

XIV. Logarithms

- A. Meaning of Logarithms
- B. Logarithms to the Base 10
- C. Determination of Complete Logarithms
- D. Finding N When Log N is Given
- E. Finding the Logarithms of numbers not given in the Tables
- F. Multiplying with Logarithms
- G. Dividing with Logarithms
- H. Finding Powers with Logarithms
- I. Finding Roots With Logarithms

Lesson #15

XV. Progressions and the Binomial Theorem

- A. Sequences
- B. Arithmetic Progressions
- C. Last Term of An Arithmetic Progression
- D. Finding Arithmetic Means
- E. Sum of An Arithmetic Progression
- F. Geometric Progressions
- G. The Last Term of a Geometric Progression
- H. Finding Geometric Means
- I. Sum of a Geometric Progression
- J. Expanding a Binomial
- K. Factorial Notation
- L. Finding a Particular Term of  $(a + b)^n$
- M. Expansions with Negative and Fractional Exponents
- N. Finding a Root by the Binomial Theorem

Unit III - Geometry and Trigonometry

Lesson #1

- I. Introduction of Mensuration
- II. Squares and Rectangles
  - A. Angles, right angles, squares and units of area
  - B. Area of rectangles and related problems
  - C. Square roots of various types of numbers

Lesson #2

III. Triangles

- A. Definitions of right triangle, base, altitude and hypotenuse
- B. Pythagorean Theorem
- C. Area of a right triangle
- D. Definition of isosceles triangle, base angle, base and vertex

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Course Outline (Continued)

Unit III - Geometry and Trigonometry (Continued)

Lesson #2 (Continued)

- E. Area of an Isosceles Triangle
- F. Definition of an Equilateral Triangle
- G. Area of an Equilateral Triangle
- H. Define Scalene or Oblique Triangle and Find the Areas
- I. Angle Measurement and Sum of Angles in a Triangle

Lesson #3

- IV. Use of constants, area of quadrilaterals and scale Drawing
  - A. Hexagon, Octagon and the Use of Constants
  - B. Quadrilaterals
  - C. Use of Scale Drawings

Lesson #4

- V. The Circle and Ellipse
  - A. Radius, Diameter, Circumference and Area of a Circle
  - B. Arc, Sectors and Central Angles
  - C. Area of a Sector and Length of an Arc
  - D. Circumscribed and Inscribed Figures and Relationships
  - E. Segment of a Circle and its Area
  - F. Area of an Ellipse
  - G. Practical Application Problems and Formulas

Lesson #5

- VI. Solid Figures and Volumes
  - A. Volume and Surface Areas of Prisms, Cylinders, and Cones
  - B. Volumes and Surface Areas of a Frustum of a Cone or Pyramid
  - C. Volume and Surface Area of a Sphere
  - D. Volumes of Composite Figures

Lesson #6

- VII. Basic Geometric Construction Including Lines
  - A. Construction of Bisectors of Lines, Angles, and Arcs
  - B. Construction of Perpendiculars of Various Types to a Given Line
  - C. Construction of Parallel Lines to a Given Line
  - D. Division of a Line Into Any Number of Equal Parts
  - E. Construction of an Equilateral Triangle and Angles of any Size

Lesson #7

- VIII. Construction Involving Circles
  - A. Determination of Center of Circle or Circular Area

Course Outline (Continued)

Unit III - Geometry and Trigonometry (Continued)

Lesson #7 (Continued)

- B. Inscription of Various Types of Plane Figures in a Circle
- C. Construction of Circles Equal in Area to the Sum or Difference of the areas of two given circles
- D. Construction of Tangents of Various Types to a Given Circle or Circles

Lesson #8

IX. Miscellaneous Constructions

- A. Construction of a Square Equal in Area to the Sum or Difference of the Areas of Two Given Squares
- B. Construction of a Square of a Given Area
- C. Construction of a Hexagon With Sides of a Given Length and With One Side on a Given Line
- D. Construction of an Octagon, an Ellipse, and a Pentagon

Lesson #9

X. Introduction to Trigonometry

Lesson #10

XI. The Oblique Triangle

- A. Use of the Law of Sines in Solving an Oblique Triangle (2 Cases)
- B. Use of the Law of Cosines to Solve an Oblique Triangle (2 Cases)
- C. Use of Formulas Involving Trigonometric Functions to Find the Area of Triangle
- D. Summary of Methods of Solving a Triangle of any Type.

Unit IV - Drawing

- Lesson #1 Beginning Drawing
- Lesson #2 Geometrical Construction
- Lesson #3 Lettering
- Lesson #4 Methods of Drawing
- Lesson #5 Three View Drawing
- Lesson #6 Three View Problems
- Lesson #7 Sections
- Lesson #8 Dimensions and Notes
- Lesson #9 Drawing Exercises
- Lesson #10 Drawing Exercises and Auxiliary Views
- Lesson #11 Projection Study
- Lesson #12 Topographical Drawing
- Lesson #13 Reproduction of Drawings

Course Outline (Continued)

Unit V - Surveying

Lesson #1

I. Field and Office Work

A. Description

- (a) Field work
- (b) Office work
- (c) Errors
  - 1. Sources of errors
  - 2. Kind of error
  - 3. Theory of Probability
  - 4. Probable Value
  - 5. Probable Error

Lesson #2

II. Measurement of Distances

- A. Methods
- B. Equipment for Chaining
- C. Chaining on Level Ground
- D. Horizontal Measurements over Uneven or Sloping Ground
- E. Measurements on Slopes
  - (a) Corrections for Slopes
  - (b) Errors in Chaining; Corrections for Changes in Temperature
  - (c) Mistakes in Chaining

Lesson #3

III. Measurements of Difference in Elevation

- A. Curvature of the Earth; Refraction
- B. Methods
  - (a) Direct or Differential Leveling
  - (b) Indirect or Trigonometric Leveling
  - (c) Profile Leveling
- C. Direct Leveling
  - (a) General Applications
  - (b) Instruments
  - (c) Leveling Rods
  - (d) Reading the Rod

Lesson #4

IV. Differential and Profile Leveling

- A. Definitions
- B. Procedure
- C. Common Mistakes in Leveling
- D. Errors in Ordinary Leveling
  - (a) Imperfect Adjustment of Instruments
  - (b) Earth's Curvature and Atmospheric Refraction
  - (c) Rod not Standard Length
  - (d) Rod not Held Plumb
  - (e) Faulty Turning Points
  - (f) Bubble not Exactly Centered at Time of Reading

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Course Outline (Continued)

Unit V - Surveying (Continued)

Lesson #4 (Continued)

- E. Profile Leveling
- F. Vertical Curves
  - (a) Plotting Profiles
  - (b) Fixing Grades
  - (c) Borrow Pit Cross-sections
  - (d) Cut and Fill Stakes
  - (e) Cross Sections of Roadway
  - (f) Plotting and Computing Earthwork

Lesson #5

- V. Measurements of Angles and Direction
  - A. General Discussion
  - B. Magnetic Meridian
  - C. Magnetic Declination
  - D. Angles and Direction
  - E. Bearings
  - F. Azimuths
  - G. Deflection Angles
  - H. Traverses
  - I. Triangulation
  - J. Surveyor's Compass

Lesson #6

- VI. The Engineer's Transit
  - A. General Description
    - (a) Telescope
    - (b) Verniers
    - (c) Graduated Circles
  - B. Use of Transit
    - (a) Setting up the Transit
    - (b) Measuring a Horizontal Angle
    - (c) Common Mistakes
    - (d) Measuring an Angle by Repetition
    - (e) Measuring a Vertical Angle
    - (f) Prolonging a Straight Line

Lesson #7

- VII. Transit Tape Surveys
  - A. General Description
  - B. Transit Surveys
  - C. Radiation
  - D. Intersection
  - E. Traversing
    - (a) Deflection-angle Traverse
    - (b) Azimuth Traverse
    - (c) Traverse Computations
    - (d) Checking Traverses
    - (e) Referencing Transit Stations



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Course Outline (Continued)

Unit V - Surveying (Continued)

Lesson #8

- VIII. Stadia Surveying
  - A. Principle of the Stadia
  - B. Inclined Sights

Lesson #9

- IX. Map Drafting
  - A. Drawings of Surveying
    - a. Vicinity Map
    - b. Typical Sections
    - c. Standards

Lesson #10

- X. Calculation of Areas of Land
  - A. Methods of Determining Area
  - B. Determining Plane Areas by Use of Coordinates

Lesson #11

- XI. Topographic Surveying
  - A. General Field Methods (Definition)
  - B. Control
    - (a) Horizontal Control
    - (b) Vertical Control
  - C. Site and Construction Surveys
    - (a) Alignment and Grade
  - D. State Systems of Plane Coordinates

Lesson #12

- XII. Route Surveying
  - A. General (Definition)
  - B. Preliminary Survey
    - (a) Transit-tape-level Method
    - (b) Transit-stadia Method
  - C. Preliminary Profile and Map
  - D. Location Survey: (Paper Location)
  - E. Field Location and Office Work

Lesson #13

- XIII. Construction Surveys
  - A. General (Definition)
  - B. Highways
  - C. Bridges

Lesson #14

- XIV. Curves
  - A. Circular Curves
  - B. Curve Formulas
  - C. Laying Out Curve by Deflection Angles
  - D. Transit Set-ups on Curves
  - E. Transition Curves



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Course Outline (Continued)

Lesson #15

XV. Cross-Sections

- A. Form of Cross-Sections
- B. Original Cross-Sections
- C. Final Cross-Section
- D. Cuts and Fills
- E. Setting Slope Stakes
- F. Plotting Cross-Sections
- G. Computations of Cross-Sections
  - (a) Volumes of Earth Work in General
  - (b) Volumes of Borrow Pits
  - (c) Volumes by Average End Areas

Lesson #16

XVI. Land Surveying

- A. Instruments and Methods
- B. Corners and Monuments
- C. Meander Lines
- D. Liability of a Surveyor
- E. Standard Lines
- F. Townships
- G. Sections
- H. Subdivision of Sections

Instructor's Lesson Plans

Unit I - Arithmetic

- Lesson Plan 1 - Whole Numbers
- Lesson Plan 2 - Common Fractions
- Lesson Plan 3 - Mixed Numbers
- Lesson Plan 4 - Decimal Fractions and Conversions
- Lesson Plan 5 - Percentage, Ratio and Proportion, and Square Roots
- Lesson Plan 6 - Measurements
- Lesson Plan 7 - Plane Figures
- Lesson Plan 8 - Solid Figures

- Class Problem #1 - Whole Numbers and Common Fractions
- Class Problem #2 - Percentages, Ratio and Proportion, Square Root and Measurements
- Class Problem #3 - Land Measures, Plane Figures, and Solid Figures

- Examination #1
- Examination #2

Answer Sheet

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Course Outline (Continued)

Unit II - Algebra

- Lesson Plan 1 - Introduction to Algebra
- Lesson Plan 2 - General Numbers
- Lesson Plan 3 - Solving Problems by Equations
- Lesson Plan 4 - Signed Numbers
- Lesson Plan 5 - Graphs
- Lesson Plan 6 - Equations with two Unknowns
- Lesson Plan 7 - Product and Quotient of Literal Numbers
- Lesson Plan 8 - Special Products and Factors
- Lesson Plan 9 - Using Algebraic Fractions in Formulas and Equations
- Lesson Plan 10 - Ratio and Proportion
- Lesson Plan 11 - Square Roots and Radicals
- Lesson Plan 12 - Quadratic Equations
- Lesson Plan 13 - Quadratic Systems
- Lesson Plan 14 - Logarithms
- Lesson Plan 15 - Progressions and the Binomial Theorem

Unit III - Geometry and Trigonometry

- Lesson Plan 1 - Introduction to Mensuration
- Lesson Plan 2 - Triangles
- Lesson Plan 3 - Use of Constants, Area of Quadrilaterals, and Scale Drawing
- Lesson Plan 4 - The Circle and Ellipse
- Lesson Plan 5 - Solid Figures and Volumes
- Lesson Plan 6 - Basic Geometric Constructions Involving Lines
- Lesson Plan 7 - Constructions Involving Circles
- Lesson Plan 8 - Miscellaneous Constructions
- Lesson Plan 9 - Introduction of Trigonometry
- Lesson Plan 10 - The Oblique Triangle

- Test on Unit 3 Lesson Plans 1, 2, and 3
- Test on Unit 3 Lesson Plans 4 and 5
- Test on Unit 3 Lesson Plans 6, 7, and 8
- Test on Unit 3 Lesson Plans 9 and 10

Answer Sheet

Unit V - Surveying

- Lesson #1 - Field and Office Work
- Lesson #2 - Measurement of Distances
- Lesson #3 - Measurements of Difference in Elevation

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Course Outline (Continued)

Unit V - Surveying (Surveying)

- Lesson #4 - Differential and Profile Leveling
- Lesson #5 - Measurements of Angles and Directions
- Lesson #6 - The Engineer's Transit
- Lesson #7 - Transit Tape Surveys
- Lesson #8 - Stadia Surveying
- Lesson #9 - Map Drafting
- Lesson #10 - Calculation of Areas of Land
- Lesson #11 - Topographic Surveying
- Lesson #12 - Route Surveying
- Lesson #13 - Construction Surveys
- Lesson #14 - Curves
- Lesson #15 - Cross-Sections
- Lesson #16 - Land Surveying

Test on U5LP 1, 2, & 3

Test on U5LP 4

Test on U5LP 5, 6, & 7

Test on U5LP 8, 9, & 10

Test on U5LP 11, 12, 13, 14, 15, & 16

Answers for U5 Lessons Plans

Answers for Tests for Unit 5

BUSINESS LETTER WRITING  
FOR INDUSTRIAL SUPERVISORS  
Supervisory Personnel  
Development

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The Business Letter Writing For Industrial Supervisors Course was written in 1959. It is available in book form. This book consists of 13 Lessons. An Instructor's Guide is also available.

The references for this course are listed below.

Title	Source
Hagar, Stewart, and Hutchinson BUSINESS ENGLISH AND LETTER WRITING	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
Robertson and Carmichael, BUSINESS LETTER ENGLISH, 2nd Edition	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
Gavin and Hutchinson, REFERENCE MANUAL FOR STENOGRAPHERS AND TYPISTS, Second Edition	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York
Lucy Graves Mayo, COMMUNICATIONS HANDBOOK FOR SECRETARIES	McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York

A detailed outline of the Business Letter Writing For Industrial Supervisors Course follows:

- Lesson I: Business Letter Writing
  - A. Past
  - B. Present
  - C. Future
- Lesson II: Why We Write Business Letters
  - A. Four Basic "musts" of business correspondence
    - 1. Clearness
    - 2. Completeness
    - 3. Conciseness
    - 4. Courtesy
- Lesson III: Overhead and the Business Letter
  - The Words We Use
    - A. Master-Bailiff words and phrases
    - B. Overworked words and phrases
    - C. Unnecessary repetitions
    - D. Negative Words
- Lesson IV: Business Letter Format
  - A. The Parts of a Business Letter
    - 1. The heading
    - 2. The date line
    - 3. The inside address
    - 4. The attention line

Course Outline (Continued)

5. The salutation
  6. The subject line
  7. The body of the letter
  8. The complimentary closing
  9. The signature lines
  10. Identification initials
  11. Enclosure reference
- Lesson V: Styles in Business Letters
- A. Style accessories
  - B. Eight styles for study
    1. Blocked
    2. Semiblocked
    3. Indented
    4. Full blocked
    5. Two-page Modified Block
    6. Hanging-indented
    7. Square-blocked
    8. The Simplified Letter
- Lesson VI: Paragraphing and Business Letter
- A. The opening paragraph
  - B. Paragraph or paragraphs containing the message
  - C. The closing paragraph containing words of leave-taking
- Lesson VII: Writing the Letter
- A. Classification of business letters
  - B. A specimen formula
- Lesson VIII: Credit and Collection Letters
- A. The three credit "C's"
  - B. Letters granting credit
  - C. Letters refusing credit
  - D. Classification of credit risks
  - E. Four collection letters
- Lesson IX: Order Letters
- A. A formula for order letters
  - B. Acknowledgments of routine orders
    1. Faulty orders
    2. Unavoidable delays in shipment
    3. Welcome to new customers
- Lesson X: Inquiries and Requests
- A. Solicited inquiries
  - B. Unsolicited inquiries
  - C. Mutual-inquiry requests
- Lesson XI: Claim and Adjustment Letters
- A. Formula for a claim letter
  - B. Formula for granting an adjustment
  - C. Formula for refusing a claim
  - D. Formula for a compromise settlement offer

BUSINESS LETTER WRITING  
FOR INDUSTRIAL SUPERVISORS  
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Course Outline (Continued)

Lesson XII: Sales Letters

- A. The relation between sales and human behavior
- B. The general principles applicable to sales letters
- C. The letter plan designed especially for sales letters
  - 1. Arouse interest
  - 2. Create desire
  - 3. Convince the prospect
  - 4. Get action

Lesson XIII: Form Letters

CONFERENCE LEADERSHIP  
Supervisory Personnel  
Development

C Page 1 of 5

The Conference Leadership material was written in 1958.  
The material is complete and bound in one book. The Hand  
Outs can be ordered separately if needed.

There are no references. A detailed course outline follows.

Introduction

I. The Conference

1. Kinds of conferences
2. The training conference - definitions
  - a. What it is not
  - b. A typical sequence of events
3. Conference training and vocational education
4. Comparison of conference methods
5. The "J" programs
  - a. Canned vs. tailored programs
6. Executive development programs
7. Definition of terms
8. Public relation values to schools
  - a. Supervisor role in hiring
  - b. A definite useful service to industry
  - c. Entree to other programs

II. The Conference Leader

A. The leader

1. A social skill
2. Personal values
3. Duties of the leader
4. Techniques
5. Need for continuous study, practice and self evaluation
6. Not to expert

B. The Conferee

1. Line and staff
2. Experience and its effect on the conference
3. Typical characters and how to handle
4. Seating
5. Scheduling of conference
6. One or more companies
7. Size of the groups

III. Preparing for a Conference

A. The Outline

1. How to go about making it - forms
2. Formulation question and objectives
3. Notes in margin
4. Plan what is to be charted
  - a. Chart headings
5. Plan the visual aids



Course Outline (Continued)

III. Preparing for a Conference (Continued)

6. Techniques in planning group participation
  - a. Role playing
  - b. Buzz sessions
  - c. Quiz sheets
  - d. Evaluate by rating
  - e. Hand out
  - f. Film case
7. Your source material
  - a. Current magazines
  - b. Other reports
  - c. Basic reading library (hand out list)
  - d. Files - by block and by subject (helpful sources)
8. Learn your outline
9. Samples of conference outlines
- B. Aids and Devices
  1. The chart or blackboard
  2. Projector equipment and films
  3. Charts, graphs, etc.
  4. Flannel Board
  5. Balancing ring
- C. Physical Arrangements
  1. The room
    - a. Free of distraction
    - b. Near comfort facilities
  2. Tables
    - a. Destroy classroom atmosphere
    - b. Ways of arranging table
    - c. Who arranges the room
  3. Name cards - in advance
    - a. How to insert names
    - b. Do not move around
    - c. Used for enrollment purpose.
  4. Projector, extension cord, etc.
  5. Charts, paper, etc.
  6. Leaders position, rostrum - affect on seating
  7. Time needed to make arrangements
  8. Plant pass

IV. Conducting a Conference

- A. First Conference - getting started
  1. Introduction - yourself by a Company or School Official - information about yourself and others
  2. Graphic demonstration (3 ring)
  3. Swapping dollars

Course Outline (Continued)

- IV. Conducting a Conference (Continued)
4. Outline responsibility - yours and theirs - cards
  5. Place cards - do not switch
  6. Hand out session titles
  7. Conference mood
  - B. Keeping on the track
  - C. Chart objectives and first question
  - D. Pacing the conference
  - E. Conference situations
  - F. Key probing words
  - G. To initiate, stimulate, and control discussion
  - H. Draw all into discussion
  - I. Start and stop on time
  - J. Deal with principles not personalities
  - K. Gain and hold confidence of group
  - L. Remember minority groups
  - M. Do not expert
  - N. Presents information or cases in the third person
  - O. Do not let conference become too academic
  - P. Gestures and movements - redirect thinking
  - Q. Humor and its use
  - R. Evaluates by order of preference not voting
  - S. Side tracking a subject for future consideration
  - T. Avoid the feeling that all you're trying to do is develop a list
  - U. Hints on overcoming "stage fright"
  - V. Rate instead of voting
  - W. Mother Hubbard terms
  - X. Evaluation
    1. Self
    2. Rating sheets
    3. Participation charts
    4. Group reaction
    5. For the company
    6. Any repeats?
    7. Value to your school
    8. Work shop and other evaluators
    9. The conference report
  - Y. Visitors
  - Z. Break after one hour
  - AA. Common weakness of inexperienced conference leaders
    1. Spends too much time getting definition
    2. Votes on importance of contribution
    3. Opposite or reverse charting contribution
    4. Does not reach conclusion
    5. Becomes a slave to rapid contributions
    6. Starts with an excessive group
    7. Drives too hard
    8. Looses control - fails to plan closing of session
    9. Participants freeze
    10. Thrown by Mother Hubbard

Course Outline (Continued)

V. The Conference Report

1. What it is and why write it
2. What information to and not to include
3. Mechanics of writing and binding
4. Copies to print
5. Piece meal type of report
6. What the bound volume should include

VI. Scope of Supervisory Personnel Development

1. Interest makes it broad
2. Functions of local school and State Department of Education
3. Canned vs. tailored
4. Methods
  - a. Conference series
  - b. Workshop
  - c. Panels
  - d. Symposiums
  - e. Question and answer method
  - f. Case study
  - g. Brainstorming
  - h. Lecture
5. Typical content of programs
  - a. Now and expected needs
  - b. Skill development - heavy participation
6. Typical prospects for supervisory personnel development programs
7. Approaching industry
8. Local and national organizations that are helpful
9. "Call Staff" and its use
10. The "Executive Development" idea

VII. The Forty-hour Workshop

1. How material is presented
  - a. Hand outs and binders
2. Topics for practice conferences
3. Time schedule
4. Evaluation
5. Practice report writing
6. Use of outside help
7. Displace aids and references
8. The film "All I Need is a Conference"
9. Demonstrate techniques
10. State specific objectives for the workshop
11. Use variety of techniques
12. Surplus stock of material
13. Prompt on first practice session

Course Outline (Continued)

Unit VII (Continued)

14. Round-robin idea
15. Selection of participants
16. Reversing the procedure
17. Participants reach a level of experting

Appendix

Slides to be used with this course are also available.  
There are 54 slides in a set at \$1.00 per slide.

ECONOMICS FOR INDUSTRIAL  
SUPERVISORS  
Supervisory Personnel  
Development

C Page 1 of 1

Industrial Economics was written in 1964. It is available in bound form in one book.

The reference for the Industrial Economics Course is the following:

Title	Source
INDUSTRY AND THE AMERICAN ECONOMY (11 booklets)	National Association of Manufacturers Education Department 2 East 48th Street New York 17, New York

A detailed outline of the Industrial Economics Course follows:

Session I - Introduction to Free Competitive Enterprise

Session II - What Makes an Economy Grow

Session III - The Role of Competition

Session IV - The Role of Marketing

Session V - Incentive and its Results

Session VI - The Role of Organization in our Economy

Session VII - Government's Role in our Economy

THE EXTEMPORANEOUS TALK  
FOR INDUSTRIAL SUPERVISORS  
Supervisory Personnel  
Development

C Page 1 of 2

The Extemporaneous Talk for Industrial Supervisors was published in 1959. It is available in book form.

The references for this course are as follows.

Title	Source
Effective Expression Part D	USAF Extension Course Institute Superintendent of Pub. Documents Washington 25, D. C.
Effective Expression Part E	USAF Extension Course Institute Superintendent of Pub. Documents Washington 25, D. C.
Irving J. Lee How To Make The Safety Speech	National Safety Council 425 North Michigan Avenue Chicago 11, Illinois
M. Joseph Doohar Effective Communication on the Job	American Management Association 1515 Broadway - Times Square New York 36, New York
Richard C. Borden Public Speaking as Listeners Like It	Harper & Brothers Publishers 49 East 33rd Street New York 16, New York
William Norwood Brignance Speech Communication	Appleton-Century-Crofts, Inc. 35 W. 32nd Street New York 1, New York
Rudolf Flesch The Art of Plain Talk	Harper & Brothers Publishers 49 East 33rd Street New York 16, New York
Edward L. Friedman The Speechmaker's Complete Handbook	Harper & Brothers Publishers 49 East 33rd Street New York 16, New York
Irving J. Lee How to Talk With People	Harper & Brother Publishers 49 East 33rd Street New York 16, New York
Effective Speaking for Supervisory Personnel	Trade & Industrial Ed. Service Division of Vocational Education State Department of Education Columbus, Ohio

THE EXTEMPORANEOUS TALK  
FOR INDUSTRIAL SUPERVISORS  
Supervisory Personnel  
Development

C Page 2 of 2

An outline of the material follows.

Part I  
You and Speech

Part II  
Stage Fright

Part III  
Planning Your Speech

Part IV  
Delivering Your Speech

Part V  
Adding Zest To Your Speech

Appendix  
"A Speech That Fits Any Occasion"

Bibliography

Slap-ons  
Session No. 1  
Session No. 2  
Session No. 3  
Session No. 4  
Session No. 5



HIGHWAY ECONOMICS  
Supervisory Personnel  
Development

C Page 1 of 3

The Highway Economics Course was published in 1960. It is available in book form.

The references for the Highway Economics Course are the following:

Title	Source
Bach, G. L., ECONOMICS, AN INTRODUCTION TO ANALYSIS AND POLICY, 3rd Ed.	Prentice-Hall, Inc., Englewood Cliffs, New Jersey
Hailstones, Thomas J., BASIC ECONOMICS	Southwestern Publishing Co. 221 Pacific Avenue Dallas 2, Texas
Samuelson, Paul A., ECONOMICS, AN INTRODUCTORY ANALYSIS, 4th Ed.	McGraw-Hill Book Company 330 West 42nd Street New York 36, New York
Federal Reserve Bank of St. Louis, YOUR MONEY SUPPLY	Research Department Federal Reserve Bank of St. Louis St. Louis, Missouri
Shultz, Wm., J. and Harriss, C. L., AMERICAN PUBLIC FINANCE, 6th Ed.	Prentice-Hall, Inc., Englewood Cliffs, New Jersey
Automotive Safety Foundation LOUISIANA'S HIGHWAY PROBLEM	Automotive Safety Foundation Washington D. C.
Biannual report of the Highway Commission of Louisiana, REPORT	Louisiana Department of Highways Baton Rouge, Louisiana
Public Affairs Research Council LOUISIANA STATE AGENCIES HANDBOOK	Public Affairs Research Council of Louisiana Baton Rouge, Louisiana
STATE OF LOUISIANA HIGHWAY FINANCE	Public Affairs Research Council of Louisiana Baton Rouge, Louisiana
Ross, William D., FINANCING HIGHWAY IMPROVEMENTS IN LOUISIANA	Division of Research College of Commerce Louisiana State University Baton Rouge, Louisiana

A detailed outline of the Highway Economics Course follows:

Preface

Session I - Introducing the Economic System

- 1 - Business and People
- 2 - Money's Place in the System
- 3 - Prices and Their Function Under Capitalism
- 4 - Government
- 5 - Other Business (Capital Goods)
- 6 - Summary

Session II - The Performance of the Economy

- A - Introduction
- B - Recessions and Depressions
  - 1 - Cures for Recession
  - 2 - Inflation
  - 3 - Cures for Inflation
- Appendix A - The Special Role of Money and Banks
  - 1 - Money Supply
  - 2 - The Role of Banks
  - 3 - The Control of Banks and the Money Supply

Session III - The Role of Government

- A - Introduction
- B - Government Spending
  - 1 - The "Comparative Benefit" Principle
  - 2 - Expanding Government's Service
  - 3 - Is Government Spending Mere Waste?
- C - Taxes
  - 1 - The "Benefit" Principle
  - 2 - The "Ability-to-pay" Principle
- D - Government Debts and Borrowing
  - 1 - Why Borrow?
  - 2 - The Real Dangers and Limits of Debt

Session IV - The Highway Dollar--Source

- A - Introduction
- B - Sources of Tax Income
  - 1 - The Gasoline Tax and Its Use
  - 2 - Motor Vehicle Tax
  - 3 - Other Taxes
  - 4 - Other Tax Idea
- C - Dedication and Limitations
  - 1 - Economic Limitations
  - 2 - The Nature of Dedicated Revenues

Course Outline (Continued)

Session IV - (Continued)

- D - Other Sources of Income
  - 1 - Mineral Lands
  - 2 - General Fund Appropriations
  - 3 - Federal Grants-in-aid
  - 4 - The Interstate System
- E - Borrowing for Highways
  - 1 - The Reason for Borrowing
  - 2 - To borrow or not to borrow
- Appendix B - Bonds and the Bond Market
  - 1 - The Borrowing Process
  - 2 - Interest, the Cost of Borrowing
- F - Summary
  - 1 - A Recent History
  - 2 - The Long Range Highway Program
  - 3 - Highway and the Economy

Session V - The Highway Dollar, Expenditures

- A - Introduction
- B - Construction
  - 1 - Paying for Construction
  - 2 - Contracting and Construction Work
- C - Maintenance
- D - Debt
  - 1 - Who Pays for the Debt
- E - Other Costs and Expenditure
  - 1 - State Aid to Parishes and Cities
  - 2 - Employees and Spending
- F - Collecting from Highways

Table 1 - Detail of Resources and Expenditures, Highway Department

Table 2 - Encumbered Funds, by Purpose

Table 3 - Estimates of Highway User Taxes Dedicated To Highway  
Department (In Thousands)

Table 4 - State Aid to Parishes

INDUSTRIAL HOUSEKEEPING  
Supervisory Personnel  
Development

C Page 1 of 1

Industrial Housekeeping was written in 1962. It is available in bound form in one book.

A detailed outline of Industrial Housekeeping follows:

Session I - Indoctrination and Overview of Program  
Definitions - Policies - Practices - Results

Session II - Housekeeping and You

Session III - Housekeeping and The Company

Session IV - Fire Protection and Good Housekeeping

Session V - What Can We (The Company and The Employee)  
Do To Improve and Maintain a Good Housekeeping  
Program?

INDUSTRIAL RELATIONS FOR  
SUPERVISORY PERSONNEL  
Supervisory Personnel  
Development

C Page 1 of 1

Industrial Relations for Supervisory Personnel was written in 1965 and is available in bound form in one book. It is composed of eight sessions.

A detailed outline of Industrial Relations for Supervisory Personnel follows:

- The First Session - History and Principles of Industrial Relations
- The Second Session - Personnel Management
- The Third Session - Employee Training
- The Fourth Session - Joint Relations and Collective Bargaining
- The Fifth Session - Union Security, Management Rights, and Arbitration
- The Sixth Session - The Labor Union in the Plant
- The Seventh Session - Wage and Salary Administration
- The Eighth Session - Seniority, Job Evaluation, and Merit Rating

INTERVIEWING FOR  
SUPERVISORY PERSONNEL  
Supervisory Personnel  
Development

C Page 1 of 1

Interviewing for Supervisory Personnel was written in 1963.  
It is available in bound form in one book.

A detailed outline of Interviewing For Supervisory Personnel follows:

- The First Session - Interviewing Responsibilities of Supervisors
- The Second Session - Counseling Interview
- The Third Session - The Employment Interview (Background and Planning)
- The Fourth Session - The Employment Interview (Conducting and Evaluating)
- The Fifth Session - The Performance Interview
- The Sixth Session - The Corrective Interview
- The Seventh Session - Other Interviews (The Exit Interview, The Stress Interview, The Group Interview, The Board Interview, and the Grievance Interview)
- The Eighth Session - Practice Interviewing

INTRODUCTION TO MANAGEMENT  
FOR INDUSTRIAL SUPERVISORS  
Supervisory Personnel  
Development

C Page 1 of 2

The Introduction to Management for Industrial Supervisors Course was written in 1964 and is available in bound books.

A detailed course outline follows.

Session I History of Management

Session II Organizational Structure

Session III Major Responsibilities of Management

Session IV Organized Labor

Session V Leadership

Bibliography

Handout Material

Handout 1 Course Contents

Handout 2 Objectives of Management

Handout 3 Principles of Scientific Management

Handout 4 Summarization of the Hawthorne Experiment

Handout 5 Characteristics of the Corporation

Handout 6 Corporate Form of Organization

Handout 7 Authority, Responsibility, and Delegation

Handout 8 Line-Type Organization

Handout 9 Line and Staff Organizational Structure

Handout 10 Planning--A Function of Management

Handout 11 Organizing--A Function of Management

Handout 12 Delegating--A Function of Management

Handout 13 Controlling--A Function of Management

Handout 14 Co-ordinating--A Function of Management

Handout 15 Structural Organization of the American  
Federation of Labor and Congress of  
Industrial Organization



INTRODUCTION TO MANAGEMENT  
FOR INDUSTRIAL SUPERVISORS  
Supervisory Personnel  
Development

C Page 2 of 2

Course Outline (Continued)

- Handout 16 The Structure of the A.F.L.-C.I.O. in  
Louisiana
- Handout 17 The Supervisor--Driver or Leader?
- Handout 18 Qualifications for Leadership
- Handout 19 Leadership Self-Appraisal Test
- Handout 20 Principles of Effective Human Relations

Listening was written in 1962. It is available in bound form in one book. Slides which are used with the course are available.

A detailed outline of Listening follows:

Introduction

Chapter I, Section I, Why Listen - Outline

Chapter I, Section I, Why Listen

Section Two, Introduction

Chapter I, Section II, Exercise

Chapter II, Section I, What Happens - Outline

Chapter II, Section I, What Happens

Chapter II, Section II, Exercise

Chapter III, Section I, What's the Matter and What to do -  
Outline

Chapter III, Section II, Exercise

Chapter IV, Section I, What Strikes the Ear - Outline

Chapter IV, Section I, What Strikes the Ear

Chapter IV, Section II, Exercise

Chapter V, Section I, Semantics - Outline

Chapter V, Section I, What Do You Mean

Chapter V, Section II, Exercise

Chapter VI, Section I, No H-Ear - Outline

Chapter VI, Section I, No H-Ear

Chapter VI, Section II, Exercise

Films

Books

LISTENING  
Supervisory Personnel  
Development

C Page 2 of 2

Course Outline (Continued)

Published Articles

Sources - Recorded Materials

Hamlet Text

Slides to be used with this course are also available.  
There are 46 slides in the set at \$1.00 per slide.

REPORT WRITING  
Supervisory Personnel  
Development

C Page 1 of 1

Report Writing was written in 1963. It is available in bound form in one book.

A detailed outline of Report Writing follows:

- The First Session - The Importance of Report Writing
- The Second Session - The Characteristics of a Good Report
- The Third Session - Organization and Form in Report Writing
- The Fourth Session - The Style of the Report
- The Fifth Session - How to Outline a Report
- The Sixth Session - Writing the Report
- The Seventh Session - The Use of Illustrations and Tables
- The Eighth Session - Problems in Preparing and Writing Reports
- The Ninth Session - The Oral Presentation of a Report
- The Tenth Session - Security Requirements

UNDERSTANDING HUMAN NATURE  
Supervisory Personnel  
Development

C Page 1 of 4

Understanding Human Nature was written in 1959. It is available in book form. There are eight sessions, each session is bound separately. The ninth book will be the Handouts, Self-tests and Student Summary.

The references for the Understanding Human Nature Course are, the following:

Title	Source
Anastasi, Ann DIFFERENTIAL PSYCHOLOGY	The Macmillan Company 60 Fifth Avenue New York 11, New York
Cameron, Norman, THE PSYCHOLOGY OF BEHAVIOR DISORDERS	Houghton Mifflin Company 432 Fourth Avenue New York 16, New York
READER'S DIGEST, April, 1947	Reader's Digest Association, Inc. Pleasantville, New York
Harper, Robert A., PSYCHOANALYSIS AND PSYCHOTHERAPY	Prentice-Hall, Inc. Englewood Cliffs, N. J.
Hepner, Harry Walker PSYCHOLOGY APPLIED TO LIFE AND WORK	Prentice-Hall, Inc. Englewood Cliffs, N. J.
Leavitt, Harold L., MANAGERIAL PSYCHOLOGY	University of Chicago Press 5750 Ellis Avenue Chicago 37, Illinois
Maier, Norman R.F., PSYCHOLOGY IN INDUSTRY Second Edition	Houghton Mifflin Company 432 Fourth Avenue New York 16, New York
Marlow, A. H., MOTIVATION AND PERSONALITY	Harper and Brothers 49 East 33rd Street New York 16, New York
Mullahy, Patric , Oedipus, MYTH AND COMPLEX	Hermitage House, Inc. 8 West 13th Street New York 11, New York
Smith, Karl U. and William M. Smith THE BEHAVIOR OF MAN	Henry Holt and Co., Inc. 383 Madison Avenue New York 17, New York
Tiffin, Joseph and Earnest J. McCormick, INDUSTRIAL PSYCHOLOGY	Prentice-Hall, Inc. Englewood Cliffs, N. J.

UNDERSTANDING HUMAN NATURE  
Supervisory Personnel  
Development

C Page 2 of 4

A detailed outline of Understanding Human Nature follows:

First Session - People are All alike in Different Ways

- I. People are all the Same
  - A. Popular Generalizations
  - B. Useful Generalizations
    - 1. All Behavior Is Caused
    - 2. All Behavior Is Motivated
    - 3. All Behavior Is Goal-Seeking
    - 4. Self-Actualizing Urge
    - 5. Same Basic Needs
    - 6. Products of Heredity and Environment

- II. People Are All Different
  - 1. Different Bases of Behavior
  - 2. Different Need-Behavior

Second Session - Human Needs - Origin of Behavior

- I. Blueprint and Behavior
- II. Levels of Needs

Third Session - What Makes People The Way They Are?

- I. What Determines Personality?
  - 1. Receptors
  - 2. Connectors
  - 3. Effectors
  - 4. Endocrine Glands
  - 1. Sources of Satisfaction
  - 2. Care in Infancy
  - 3. Examples Set by Parents
  - 4. Treatment by Intimates
  - 5. Demands vs Capacities
  - 6. Success vs Failure
- II. Psychoanalytic Interpretations

Fourth Session - What Makes People the Way They Are (Continued)

- I. Frustration
- II. Significant Traits
- III. Habits--Curse or Blessings?

Fifth Session - Nature and Uses of Motivation

- I. The Nature of Motives
- II. Universal Motives
- III. Applying Motivation

Sixth Session - Attitudes and Morale

- I. Checking Attitudes
- II. How Attitudes Work
  - 1. Imitation
  - 2. Emotional Experiences
  - 3. Informative Experiences
  - 4. Self-Cultivation
- III. Job Aspects Important to Workers
- IV. Team Spirit on the Job
  - 1. Supervisory Relationships
  - 2. Decision Making
  - 3. Clean Communications

Seventh Session - How Working Conditions Affect Human Behavior

- I. The Human Nature of Accidents
  - 1. Vision
  - 2. Age or Length of Service
  - 3. Emotions
  - 4. Mental Ability
  - 5. Impulsiveness
  - 6. Popularity
- II. Working Conditions and Efficiency
  - 1. Visual Conditions
  - 2. Noise Conditions
  - 3. Temperature Conditions
  - 4. Work Hours
  - 5. Rest Pauses
  - 6. Boredom
- III. Human Engineering
  - 1. Information-Receiving
  - 2. Decision-Making
  - 3. Action-Taking

Eighth Session - How Co-Workers Affect Behavior of Each Other

- I. Person-to-Person Behavior



II. Structure and Operation of a Group

III. Communication Systems in Groups

Selected Bibliography

Handouts #1, 2, 3, 4.

Slides to be used with this course are also available.  
There are 76 slides in a set at \$1.00 per slide.

WORK SIMPLIFICATION  
Supervisory Personnel  
Development

C Page 1 of 1

Work Simplification was written in 1962. It is available in bound form in one book.

A detailed outline of Work Simplification follows:

The First Session, Part I	Introduction to the Program
The First Session, Part II	Discussion of the Work Distribution Chart
The Second Session	Group Laboratory Meeting on The Work Distribution Chart
The Third Session	Discussion of the Process Chart
The Fourth Session	Group Laboratory Meeting on the Process Chart
The Fifth Session	Discussion of the Work Count
The Sixth Session	Individual Laboratory on the Work Count
The Seventh Session	Final Group Laboratory "Work Simplification Roundup"

Slides to be used with this course are also available.  
There are 72 slides in a set at \$1.00 per slide.

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